



Cafe CAT-DEV

QuickStart Guide

This guide describes the setup procedure for the CAT-DEV development kit (devkit) and the Cafe development environment. Hardware components of the Cafe development environment included CAT-DEV with Host Bridge and Cafe main board, Host PC, gigabit switch, TV or monitor, and controllers.

Confidential

These coded instructions, statements, and computer programs contain proprietary information of Nintendo and/or its licensed developers and are protected by national and international copyright laws. They may not be disclosed to third parties or copied or duplicated in any form, in whole or in part, without the prior written consent of Nintendo.

TABLE OF CONTENTS

Cafe CAT-DEV QuickStart Guide	6
Common Terms.....	7
Prerequisites	9
CAT-DEV Development Environment.....	9
CAT-DEV Host PC and Network Requirements.....	10
Host PC Minimum Requirements	10
Network Requirements	10
Supported CAT-DEV Devkits.....	11
Multiple Devkits	11
Supported Displays.....	11
Set Up Your Development Environment	12
Step 1: Install the SDK on the Host PC	13
Step 2: Install the SDK Docs Patch	13
Step 3: Install the SDK Demo Patch	14
Step 4: Set Up the CAT-DEV.....	14
Unmanaged Switch Connection (Preferred)	15
Step 5: Set the Default Device.....	21
Step 6: New CAT-DEV System Update.....	23
Update Your CAT-DEV System.....	23
Step 7: Run the System Configuration Tool	26
Step 8: Install the MULTI Tool Chain from Green Hills Software	27
Update MULTI Tool Version in cafe.bat/cafex_env.bat	34
Step 9: Set Up the Wii U GamePad for the CAT-DEV	34
Set Up DRC-DK MP	34
Set Up DRC-DK-TV	39
Pair the DRC	41
Update DRC Firmware.....	42
Use Your CAT-DEV	46
Start Up and Shut Down Your CAT-DEV	46
Build SDK Demos.....	48

Using Cygwin	48
Using MinGW/MSYS	55
Using build_sdk_demo.bat.....	58
Run SDK Demos.....	58
Debug Your Application	59
Serial Logging on the Wii U	62
Hardware	62
USB-to-Serial Adapter	62
Serial Adapter Chipsets.....	62
Serial Adapter for the Wii U	63
Serial Adapter for the Host PC.....	63
Cross-Over Cable.....	64
Software	64
Troubleshooting Serial Logging.....	64
CAT-DEV Network Connection Configurations.....	65
Unmanaged Switch Connection (Preferred).....	66
Second Network Interface Card (NIC).....	72
Direct Connection	80
Using Host Bridge Software	87
Check the Version of the Host Bridge Software	87
Find the Name and IP Address of a Bridge.....	87
Configure the CAT-DEV as the Default Device.....	88
Update the Bridge Firmware Only	89
Resetting the CAT-DEV to Factory Default Settings.....	91
Troubleshoot CAT-DEV Issues.....	92
Troubleshoot Network Installation and Setup Issues.....	92
Findbridge Can't Find CAT-DEV - Broadcast Packets Not Allowed on LAN	92
Findbridge Can't Find CAT-DEV - Operation Across Broadcast Domains.....	93
Findbridge Can't Find CAT-DEV - Windows Firewall.....	93
Findbridge Can't Find CAT-DEV Connected to UnManaged Switch - Operation From VPN to Another Network.....	93
Cannot Acquire IP Address - DHCP Unavailable	93

Restore Factory Default Network Settings	93
CAT-DEV LED Descriptions	94
cafe.bat opens with a warning message	95
Troubleshoot GamePad (DRC) Issues	95
Posting your GamePad (DRC) issue for discussion	95
Troubleshoot Update Issues	95
Updating a CAT-DEV fails with error -262146	95
Troubleshoot Demo Failure Issues	96
SDK demos fail to run due to file permission errors on the host PC	96
Troubleshoot Boot Mode Issues	96
Recover a CAT-DEV with NAND-related issues	96
The <code>cafex run</code> command fails	97
The <code>cafex run</code> and <code>cafex setbootmode PCFS</code> commands fail	97
The <code>cafex on</code> and <code>cafex run</code> commands fail	98
The CAT-DEV only boots into System Config Tool	98
The <code>cafex run</code> , <code>cafex on</code> , or other <code>cafex</code> commands fail with mismatched boot mode	98
Troubleshoot Screen Issues	98
The screen of a device attached to a CAT-DEV dims	98
GamePad Bug Report Form	99
[Title]	99
[Description]	99
[Environment]	99
Revision History	100



Cafe CAT-DEV QuickStart Guide

The Cafe Tool for Development (CAT-DEV) hardware system is the basic Cafe development kit. It connects to a host PC over a network to facilitate application development. The host PC provides file system emulation for the CAT-DEV. This means that the application that is being developed and its associated files can be generated and maintained on the PC. The CAT-DEV has a bridge which transparently routes all file I/O requests to the PC, making it unnecessary to burn an optical disc or install content on the internal storage of the CAT-DEV.



This guide describes the Cafe development environment and the setup procedure for the CAT-DEV development kit (devkit). With the Cafe development environment, developers may:

- Compile and link applications.
- Load and run applications.
- Debug applications.
- Monitor audio and video output.
- Monitor debug and log output.
- Use peripherals, such as mass storage media, game controllers, and network interfaces.
- Use the host PC to provide file system emulation for the devkit application.

NOTE If you are using a CAT-R only, see *the Cafe SDK CAT-R QuickStart Guide* for instructions.

Common Terms

Term	Definition
API	An Application Programming Interface (API) is a protocol that software components use to communicate with each other. An API may include specifications for functions, data structures, object classes, and variables.
SDK	The Software Development Kit contains a set of application programming interfaces (APIs) and other software development tools that are used to develop, build, run, debug, and master applications for the Wii U.
CAT-DEV	The Cafe Tool for Development (CAT-DEV) hardware system. The host PC provides file system emulation for the CAT-DEV application. This means that the application and its associated files may be generated and maintained on the PC. The host bridge hardware in the CAT-DEV transparently routes all file I/O requests to the PC. Therefore, burning an optical disc or installing content on the CAT-DEV internal storage is not necessary.
CAT-R	Cafe Tool for disc Reader (CAT-R) is a Cafe development system that has an optical disc drive. It is similar to the Wii U retail system and should be used for final application testing.
Wii U GamePad	The Wii U GamePad (GamePad) is a controller for the Cafe system that has a built-in touch-panel LCD screen. The GamePad outputs video and audio processed by the Wii U, and inputs control information from the touch screen and buttons, audio from the onboard microphone, and video from the onboard camera to the Wii U. It is also referred to as the Display Remote Control (DRC).
DRC-DK	The standard DRC unit for Wii U development. Similar to a retail Wii U gamepad, the unit can be paired with any Wii U devkit.
DRC-DK MP	Connects to a CAT-DEV or CAT-R wirelessly or by using a cable. The DRC-DK MP has a jack for making a wired connection.
DRC-DK-TV	Functionally equivalent to the standard DRC-DK but with two exceptions. The DRC-DK-TV can only operate in wired mode, and has HDMI and audio output ports to facilitate video/audio capture from the DRC.
System Config Tool	Software utility that runs on a CAT-DEV or CAT-R, and helps users set up system configurations, manage titles, and save data necessary for game development. The System Config Tool replaces an older utility known as DevMenu.
HOME Menu	The HOME Menu (HBM) is a system application that is activated when the user presses the HOME Button on the controller. This application provides a uniform interface for exiting an application; launching the Internet browser, e-manual reader, or other overlay applications; or adjusting various system preferences. The HBM is a system software component that is not linked to a game.
NAND boot mode	NAND boot mode (NAND mode) is a CAT-DEV mode of operation that is determined by the bootloader. In NAND mode, the majority of the files referenced by the system,

Term	Definition
	on boot and as it runs applications, come from the CAT-DEV's internal, NAND-based, file system. Boot firmware, the OS, System Config Tool, and other system applications are installed on the internal NAND storage. NAND boot mode more closely resembles the final retail system and enables you to use the CAT-DEV without a host PC. It is useful for large-scale program testing and validation before burning the program to optical disc.
PCFS boot mode	PCFS boot mode (PCFS mode) is a CAT-DEV mode of operation that is determined by the bootloader. In PCFS mode, only the low-level boot firmware is stored on the internal NAND storage. The operating system, System Config Tool, system applications, and developer programs reside on the host PC. PCFS boot mode, regardless of the transport choice, is not compatible with headless, or standalone mode, because PCFS requires file system service from the host PC, connected via Ethernet.

For more information on Common Terms, see the *Cafe Glossary* in the online MAN pages.

Prerequisites

CAT-DEV Development Environment

The Cafe Development Environment consists of:

Cafe SDK Environment

- The base Cafe Software Development Kit (SDK).
- The Cafe SDK Docs Patch (documentation is now unbundled from the base SDK).
- The Cafe SDK Demo Patch (demo patch is now unbundled from the base SDK).

Hardware Environment

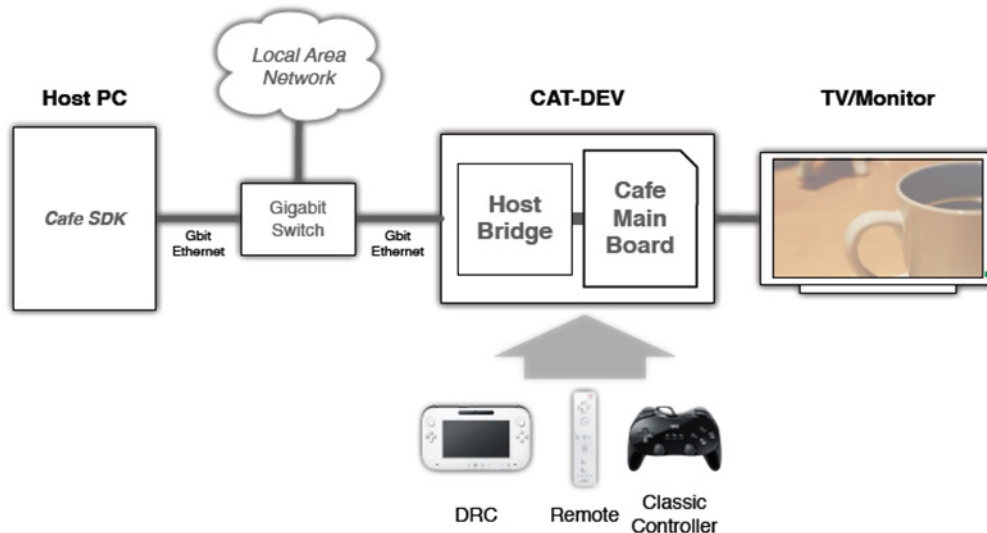
- The Cafe Development Kit (CAT-DEV, or devkit). The CAT-DEV tool, CAT-DEV MP + DRC-DK, includes in the box:
 - CAT-DEV
 - DRC-DK MP
 - Wii Remote Plus (wireless)
 - HDMI cable
 - Stereo AV cable
 - USB to RS-232 cable
- A host PC.
- A network switch or secondary network interface card (NIC) are recommended (optional).
- A television or monitor (optional).
- Development controllers that include the Wii U GamePad, Wii Remote, and Wii U Pro Controller (optional).

NOTE

The host PC, Ethernet switch, secondary NIC, and television or monitor are not included with the CAT-DEV hardware. These must be provided by the user.

Software Environment

- Cygwin or MinGW/MSYS, which are needed only for building the SDK demos, and not for operation of the devkit.
- The CafeX tool, a .NET application that executes Cafe applications without using Cygwin. This tool is the first stage in an effort to eliminate dependency of the Cafe SDK on Cygwin.
- The Host Bridge Software package.
- The MULTI tool chain from Green Hills Software, which is downloaded separately. For more information, see [Install the MULTI Tool Chain](#).



Primary hardware components for the Cafe Development Environment

CAT-DEV Host PC and Network Requirements

Host PC Minimum Requirements

The minimum computer requirements for the host PC are as following:

- 2 GHz Core 2 Duo-class CPU or better.
- 2 GB or more of RAM; 4GB or more if using the mastering tool.
- 40 GB or more of free hard-disk space that is formatted using NTFS.
- 100GB or more of additional free hard-disk space if mastering titles.
- Microsoft Windows 7 Professional with Service Pack 1 (x64).
- Microsoft .NET Framework 4.
- Microsoft Visual C++ 2010 SP1 Redistributable Package (x64).
- Administrator account to install and use the Cafe SDK and associated tools.
- 1 GB Ethernet network port.

Network Requirements

For best results, ensure that you have the following:

- An unmanaged gigabit Ethernet switch.

- A reserved DHCP IP address or statically assigned IP address for the CAT-DEV from your IT department.
- Proxy settings may need to be configured to bypass the CAT-DEV IP address.

Supported CAT-DEV Devkits

The SDK provides support for a CAT-DEV with a Wii U GamePad (DRC-DK MP or DRC-DK-TV) and a Wii U Pro Controller. For more information about supported features and known issues, see the release notes included in the SDK release package.

NOTE

The instructions in this document pertain to CAT-DEV units only. For instructions on using CAT-R units, see the *Cafe SDK CAT-R QuickStart Guide*.

Multiple Devkits

It is recommended that no more than 16 devkits be connected to a single host PC in the development environment. The actual number of devkits that may be connected to a host PC varies, depending on the hardware configuration of the host PC that the devkits are connected to and the network environment. For more information about using multiple devkits, see ***Cafe SDK Basics*** → ***Development Cycle*** → ***Run Applications*** → ***Multiple Devkit Feature*** in the online MAN pages.

Supported Displays

Any HDTV television or monitor with the following is supported:

- Up to 1080p resolution.
- HDMI, component, S-video, or composite video inputs.

Set Up Your Development Environment

To help ensure that the CAT-DEV system setup is successful, perform the installation and setup steps in the order that they are listed. The steps to set up the Cafe SDK and the CAT-DEV system are:

1. [Install the base SDK on the host PC.](#)
2. [Install the Docs Patch for the documentation.](#)
3. [Install the Demo Patch for the demo programs.](#)
4. [Set up the CAT-DEV hardware, install the Host Bridge Software on the host PC, and set IP addresses for the CAT-DEV and host PC.](#)
5. [Set the Default Device.](#)
6. [New CAT-DEV System Update.](#)
7. [Launch the System Configuration Tool.](#)
8. [Install the MULTI tool chain from Green Hills Software on the host PC.](#)
9. [Set up the Wii U GamePad and update the firmware.](#)

Step 1: Install the SDK on the Host PC

The base Cafe SDK package contains:

- Prebuilt firmware, operating system, drivers, and libraries.
- A script and makefile based build system.

To install the base SDK, unzip the SDK package to a safe location on the host PC.

Ensure that there are no spaces anywhere in the file path name for the SDK. Also, avoid using a lengthy file path to the SDK installation.

Examples of path names that are acceptable:

- `C:\cafe_sdk`
- `C:\cafe_sdk_21003`
- `C:\Users\jdoe\Desktop\CAFE_SDK`

Examples of path names that are not acceptable:

- `C:\cafe sdk`
- `C:\Users\John Doe\Desktop\CAFE_SDK`
- `C:\User Dir\jdoe\Desktop\CAFE_SDK`

IMPORTANT

Do NOT unzip the package over an existing SDK installation. Full SDK releases are meant to stand alone.

Step 2: Install the SDK Docs Patch

The Cafe SDK Docs Patch contains the documentation for the Cafe SDK.

To install the Docs Patch:

1. Open the Docs Patch ZIP file.
2. Right-click the `cafe_sdk` folder in the Demo Package ZIP file, and then click **Copy**.
3. Right-click anywhere in the folder where you unzipped the SDK package, and then click **Paste**.
4. In the *Confirm Folder Replace* dialog box, click **Yes** to confirm that you want to merge the existing `cafe_sdk` folder with the `cafe_sdk` folder that you copied from the Docs package.

Step 3: Install the SDK Demo Patch

The Cafe SDK Demo Patch contains the source code and associated files for the demo programs that are referenced throughout this manual.

To install the Demo Patch:

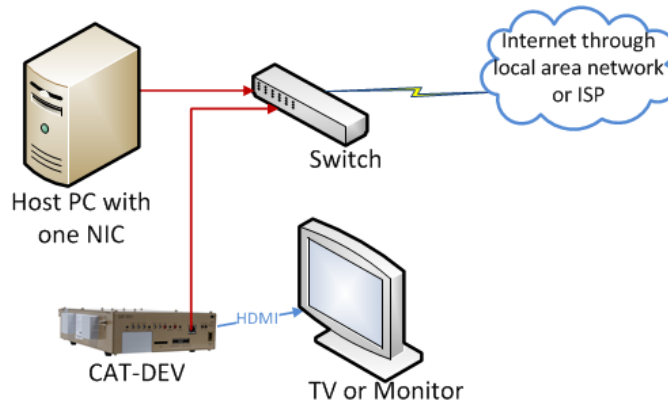
1. Open the Demo Package ZIP file.
2. Right-click the `cafe_sdk` folder in the Demo Package ZIP file, and then click **Copy**.
3. Right-click anywhere in the folder where you unzipped the SDK package, and then click **Paste**.
4. In the *Confirm Folder Replace* dialog box, click **Yes** to confirm that you want to merge the existing `cafe_sdk` folder with the `cafe_sdk` folder that you copied from the Demo package.

Step 4: Set Up the CAT-DEV

In this section, you will set up your CAT-DEV, which includes connecting it to the host PC, installing Host Bridge Software, and assigning IP addresses to the host PC and CAT-DEV. There are three supported connection configurations, but it is recommended to use the unmanaged switch configuration. To learn how to setup other configurations, see the [CAT-DEV Network Connection Configurations](#) section of this document.

Unmanaged Switch Connection (Preferred)

In the following steps, you will set up your CAT-DEV system using a host PC and a gigabit switch on a local area network (LAN).



Host PC with a single NIC and CAT-DEV that are connected to the Internet through a switch.

NOTE

For this connection method, you must obtain a reserved DHCP or static IP address for your CAT-DEV from your IT department.

NOTE

The LAN port on the CAT-DEV is only for communication with the host PC. You may not connect the CAT-DEV directly to the Internet from this port. If you want to connect to the Internet from the CAT-DEV, you must use a router with a wireless connection or a Wii LAN adapter connected to a USB port.

Set Up Your CAT-DEV Hardware

To set up the CAT-DEV hardware using an unmanaged switch

1. Using a CAT5e Ethernet patch cable, connect the LAN port on the CAT-DEV to a port on a gigabit Ethernet (GigE) switch that is also connected to your local area network (LAN). To obtain gigabit speed on your CAT-DEV network, ensure that the NIC on the host PC, the Ethernet patch cable, and the unmanaged switch are all GigE capable.
2. Using a CAT5 Ethernet patch cable, connect the host PC to another port on the Ethernet switch, and then ensure that the switch is connected to the network.
3. Using an HDMI or other video cable, connect the CAT-DEV to a television or monitor.
4. Using the power cable, plug the CAT-DEV in to an electrical outlet.
5. Configure the NIC on the host PC following the instructions provided by your IT department.
6. To turn the CAT-DEV on, press the switch on the side of the CAT-DEV. The system turns on in an idle state. The red OFF light on the front of the CAT-DEV is illuminated, but the ON light remains off. In this mode, the CAT-DEV is listening for commands from the PC, but is not actually running any applications.

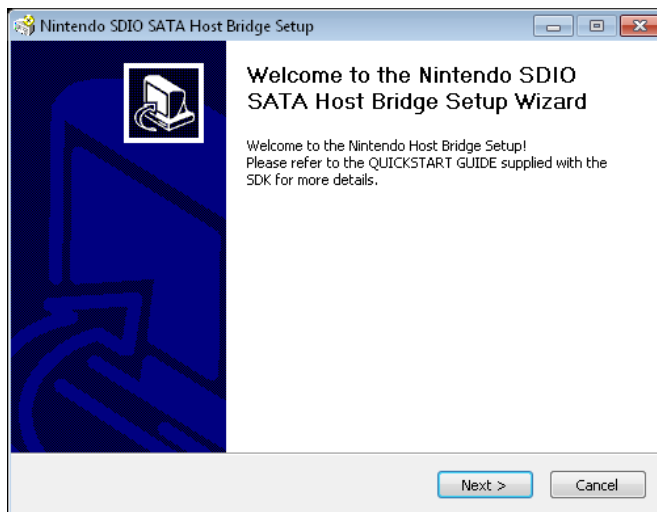
7. Wait at least one minute for the CAT-DEV to receive an IP address from the network.

Install Host Bridge Software

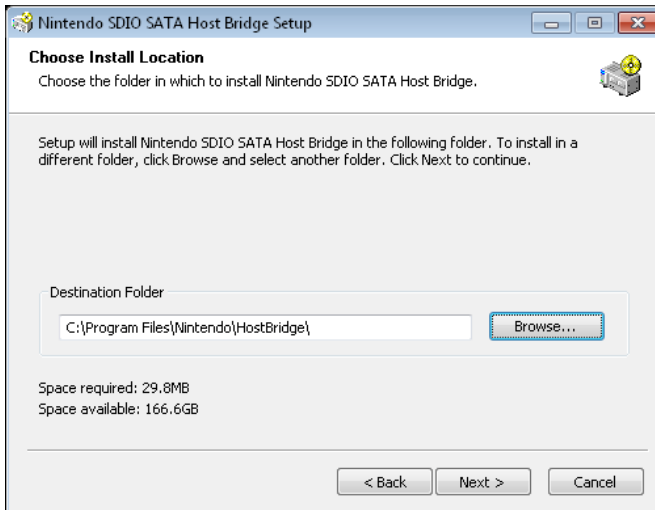
The Host Bridge software enables your host PC to communicate with the CAT-DEV. The installer file is provided outside of the Cafe SDK and must be downloaded separately. If the installer file is not available locally from a secondary source, log on to the Wii U Home page of your local Nintendo developer support group website, click **Cafe SDK**, and then scroll down to the **Misc** section. Download the latest version of the HostBridge Software package.

To install Host Bridge software on your host PC

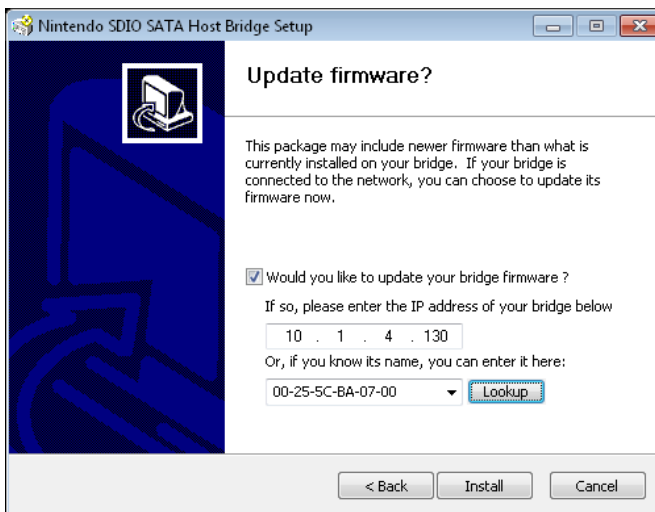
1. Power on your CAT-DEV.
2. Navigate to the folder where you extracted the HostBridge files, and then double-click HostBridgeSetup_3.2.x.x.exe. The Nintendo SDIO SATA Host Bridge Setup wizard starts.
3. On the Welcome page, click Next.



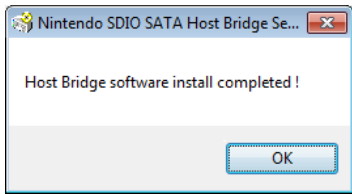
4. On the *Choose Install Location* page, type the location where you want the Host Bridge software installed in the *Destination Folder* text box, and then click **Next**. It is recommended that you use the default installation directory, C:\Program Files\Nintendo\HostBridge.



5. Note the MAC address on the sticker that is located on the opposite side of the CAT-DEV from the power switch. The MAC address is a 12-digit hexadecimal number, for example: 00-25-5C-BA-53-1D.
6. On the *Update firmware* page:
 - a. Ensure that the *Would you like to update your bridge firmware* check box is selected.
 - b. To find the IP address of your host bridge, type the CAT-DEV MAC address from the previous step in the text box beside the **Lookup** button, and then click the **Lookup** button. The IP address of your CAT-DEV is added automatically in the IP address text box.
 - c. Note the IP address. You will need it later.
 - d. Click **Install**.



7. The host bridge firmware update takes a few minutes to complete. When the firmware update finishes, the *Host Bridge software install completed* dialog box is displayed. Click **OK**.

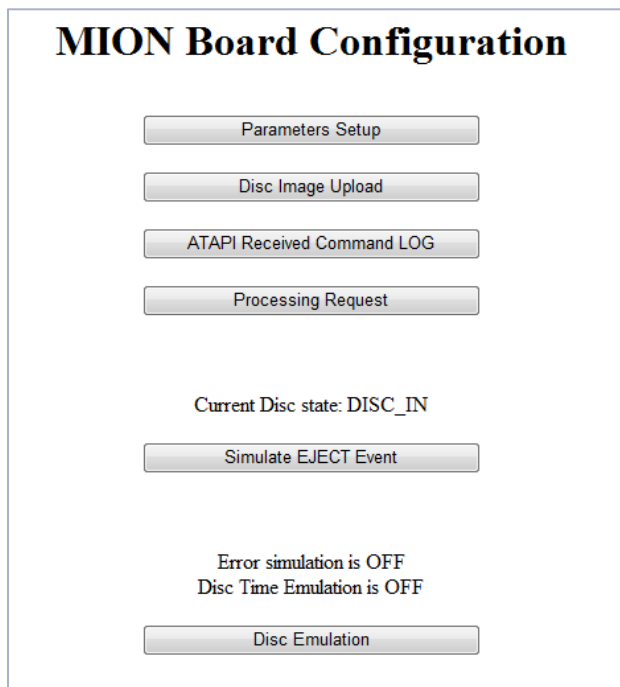


Set Up IP Addresses

For this connection method, you must obtain a reserved DHCP or static IP address from your IT department for the CAT-DEV. If you do not, there is a risk that the IP address on the CAT-DEV will change without notice, requiring you to discover the new IP address and repeat the steps to assign the IP address to the CAT-DEV.

To set up the IP address on your CAT-DEV

1. In a web browser, type the CAT-DEV IP address that you noted previously in the address bar, and then press ENTER. This opens the *MION Board Configuration* page. Click **Parameters Setup**.



NOTE

If your network environment uses an HTTP proxy, you may need to add the IP address to the *Bypass Proxy* list in the host PC network settings. Contact your IT department for more information.

NOTE

If you are having trouble with the initial network setup, resetting the CAT-DEV to factory default settings may be helpful. It enables you to begin setting up your CAT-DEV again from a known configuration. For more information, see [Restore Factory Default Network Settings](#).

2. On the *MION Board Parameter Settings* page:
 - a. If you received a static IP address from IT for the CAT-DEV in the *IP Address* text box, click **DHCP OFF**, and then click **Write** to save your changes. Otherwise, skip this step.

MION Board Parameter Settings

	IP Address 10.1.48.48
	Subnet Mask 255.255.255.0
	Default Gateway 0.0.0.0
	DHCP ☐ ON ☒ OFF

- b. To change the name of the CAT-DEV, type the new name in the *Machine Name* text box, and then click **Write** to save your changes. The name may be 254 characters or less, and contain only alphanumeric characters and hyphens.

Device Unique	Machine Name 00-25-5C-BA-07-00
	MAC Address 00-25-5C-BA-07-00
Write Form Reset	

NOTE

If you changed any IP-related settings that make the CAT-DEV inaccessible, including changing the IP Address, an error message is displayed, *Page cannot be displayed*, after you select **Write**. The saved changes **did** take effect. The error message is the result of changing the IP Address for the CAT-DEV, which requires that you enter in the new IP address in the address bar. Also, other network changes may have been made that require you to update network settings on the host PC.

- c. Close the *MION Board Parameter Settings* page.

3. Confirm that your network connection is valid by connecting to the MION page again. Open a web browser and then the IP address that you just set in the address bar. If this is successful, you may proceed to [Set the Default Device](#).

Step 5: Set the Default Device

1. Navigate to the folder where you installed the Cafe SDK, and then double-click `cafex_env.bat`. The command window opens.

```
=====

Welcome to the Nintendo CAFE!

=====

Environment initialized for this session only.

SDK_VER           = 2.11.03
CAFE_ROOT         = C:\Users\AUser\Desktop\cafe_sdk
CAFE_HARDWARE     = catdevmp
CAFE_BOOT_MODE    = PCFS
GHS_ROOT          = C:\ghs\multi5322
CAFE_GHS_VERSION  = "v5.3.22 P0"
CAFE_CONTENT_DIR  = C:\Users\AUser\Desktop\cafe_sdk\data\disc\content
CAFE_SAVE_DIR     = C:\Users\AUser\Desktop\cafe_sdk\data\save
CAFE_SLC_DIR      = C:\Users\AUser\Desktop\cafe_sdk\data\slc
CAFE_MLC_DIR      = C:\Users\AUser\Desktop\cafe_sdk\data\mlc
Current bridge    = Docs
Bridge IP Addr    = 10.1.4.130

-----
```

2. At the command prompt, type the following, and then press ENTER.

```
setbridge -default [bridge_name] [ip_addr]
```

where `[bridge_name]` is the case-sensitive name of the CAT-DEV, and `[ip_addr]` is the IP address that you obtained from IT for the CAT-DEV.

```
=====

Welcome to the Nintendo CAFE!

=====

Environment initialized for this session only.

SDK_VER           = 2.11.03
```

```
CAFE_ROOT          = C:\Users\AUser\Desktop\cafe_sdk
CAFE_HARDWARE      = catdevmp
CAFE_BOOT_MODE     = PCFS
GHS_ROOT           = C:\ghs\multi5322
CAFE_GHS_VERSION   = "v5.3.22 P0"
CAFE_CONTENT_DIR   = C:\Users\AUser\Desktop\cafe_sdk\data\disc\content
CAFE_SAVE_DIR      = C:\Users\AUser\Desktop\cafe_sdk\data\save
CAFE_SLC_DIR       = C:\Users\AUser\Desktop\cafe_sdk\data\slc
CAFE_MLC_DIR       = C:\Users\AUser\Desktop\cafe_sdk\data\mlc
Current bridge     = Docs
Bridge IP Addr     = 10.1.4.130
-----
C:\Users\AUser\Desktop\cafe_sdk>setbridge -default mybridge 10.2.2.1
```

NOTE

If you need to change these settings, re-enter the `setbridge -default [bridge_name] [ip_addr]` command using the new device name and/or IP address.

Step 6: New CAT-DEV System Update

The following steps describe how to update the SDK version of a new CAT-DEV MP system regardless of the SDK firmware version currently installed.

Update Your CAT-DEV System

Use the following steps to update a CAT-DEVs SDK firmware version.

1. Open a `cafe.bat` shell command.
2. Observe whether `cafe.bat` prints a version mismatch diagnostic message that is similar to the following:

```
!!! Your CAT-DEV is not at the same level as this SDK. !!!

SDK Version: 2.12.04  CAT-DEV SDK Version: 0.0.0

!!! Please run cafeupdate to get them in sync. !!!
```

3. Using the CAT-DEV SDK Version number obtained in the previous step, choose one of the following options:
 - a) If the CAT-DEV SDK Version number listed is anything other than 0.0.0, update the CAT-DEV by using the steps in the [CAT-DEV System Upgrade Using cafeupdate](#) section.
 - b) If the CAT-DEV SDK Version number listed is 0.0.0, update the CAT-DEV by using the steps in the [CAT-DEV System Upgrade Using the One-Shot Updater](#) section.

CAT-DEV System Upgrade Using cafeupdate

Use `cafeupdate` with the following instructions to upgrade or downgrade the SDK version on your CAT-DEV.

IMPORTANT

Prior to running `cafeupdate`, ensure that the CAT-DEV *System Mode* is set to *Development* mode. In the System Config Tool, the *System Mode* setting is found in the *Boot Configuration* menu. Additionally, the CAT-DEV and PC environment must be in PCFS mode. For more information, see ***Cafe SDK Basics*** → ***Development Cycle*** → ***Run Applications*** → ***Tools to Run Applications*** → ***cafex*** → ***cafex setbootmode*** in the MAN pages.

1. From a `cafe.bat` shell command prompt in the target SDK, type `cafeupdate`, and then press ENTER.

```
$ cafeupdate

Using CafeControl
```



```
cafex input/keyboard encoding code page: 1252
cafex output/screen encoding code page: 65001
cafe output/stream encoding code page: 65001
Performing system update using System Config Tool...
Executing cafex recover for mixed PCFS...

cafex recover

log directory is c:\src\cafe\branches\sdk_2_12\temp\<user-
name>\caferecover\<date>

recover source directory is /vol/storage_hfiomlc01/sys/update/mixed
cafex update: Single pass CGI enabled

cafex: Cleaning content in
'c:\src\cafe\branches\sdk_2_12\data\mlc\sys\update\mixed'

cafex: Preparing content in
'c:\src\cafe\branches\sdk_2_12\data\mlc\sys\update\mixed'

Detected BOOT mode : DUAL 2.11.10

recover_flags=001020000122

Executing cafex on -recover...

...

00:10:31:679: MCP: Update Done, err 0

[["Update Done, err 0" found]]

monitor returned PASS

Executing cafex stop...

Removing log directory c:\src\cafe\branches\sdk_2_12\temp\<user-
name>\caferecover\<date>

cafex recover complete. Exiting with code 0

CAFE_BOOT_MODE=PCFS

cafex setbootmode: PASS

Attempting to update DRC

...

The DRC update returned with error code 0.

DRC Update completed successfully!
```

```
drc_update end.
```

```
Pattern Matched 'drc_update end
```

```
cafex update: Single pass CGI enabled
```

```
[8244]-1:15:31:552:FSEmul : DVDFS/ATFS SDIO emulator bypassed
```

```
$
```

2. After the `cafeupdate` process completes, the CAT-DEV is at the target SDK version.

CAT-DEV System Upgrade Using the One-Shot Updater

Use the One-Shot Updater with the following instructions to upgrade or downgrade the SDK version on your CAT-DEV.

1. Log on to the Wii U Home page of your local Nintendo developer support group website.
2. Click **Dev Hardware**.
3. Download the *CAT-DEV One-Shot Updater for SDK 2.08.07* or later package.
4. Carefully follow the instructions in the `Readme_cat-dev_one-shot_updater` file.

Step 7: Run the System Configuration Tool

These steps will verify that your CAT-DEV is set up properly and is ready to run applications.

The application used here is the System Configuration Tool, which is an interactive application that displays to the TV that allows a developer to modify and manage settings on a CAT-DEV.

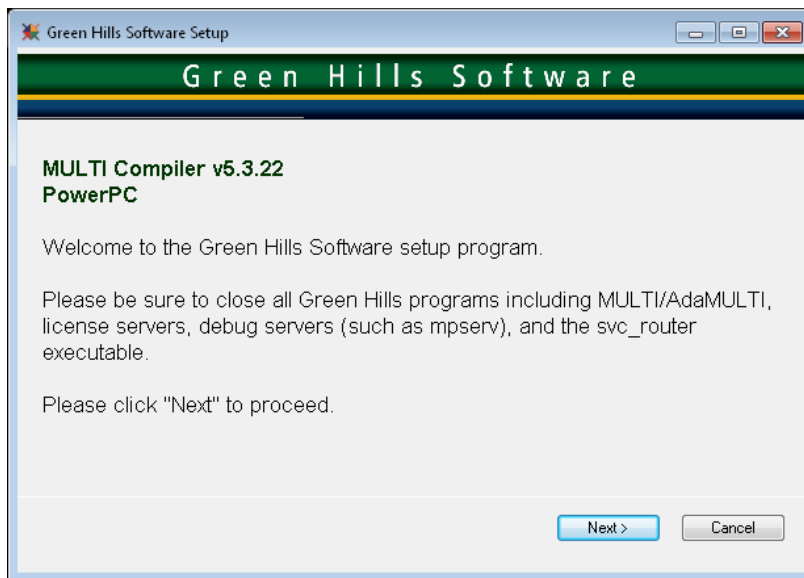
1. Open the folder where you installed the Cafe SDK.
2. Double-click `cafex_env.bat`.
3. At the command prompt, type the following command, then press ENTER.
`cafex on`

The System Configuration Tool will appear on the display. This tool can be navigated using an attached Wii Classic Controller or the host PC's keyboard.

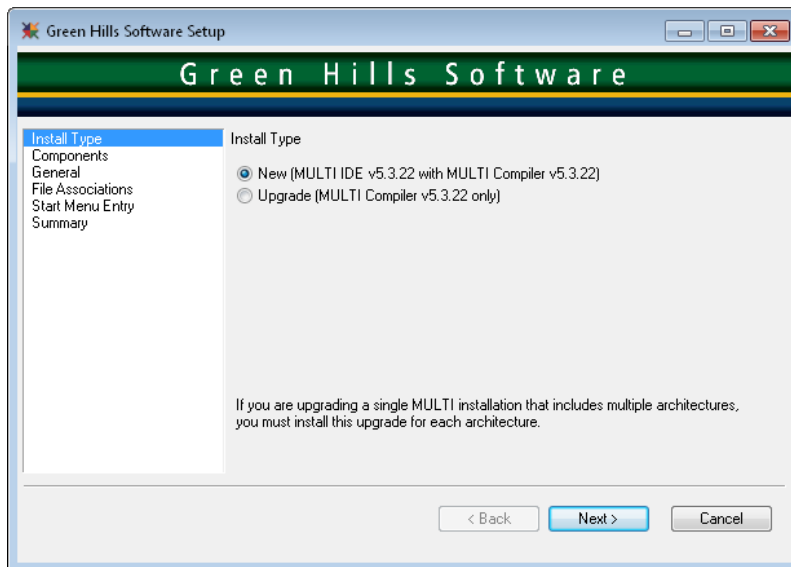
Step 8: Install the MULTI Tool Chain from Green Hills Software

The MULTI tool chain from Green Hills Software (MULTI) provides the compiler, linker, and debugger for the Cafe SDK. The installer may be found on the Environment downloads page of your local Nintendo developer support group website.

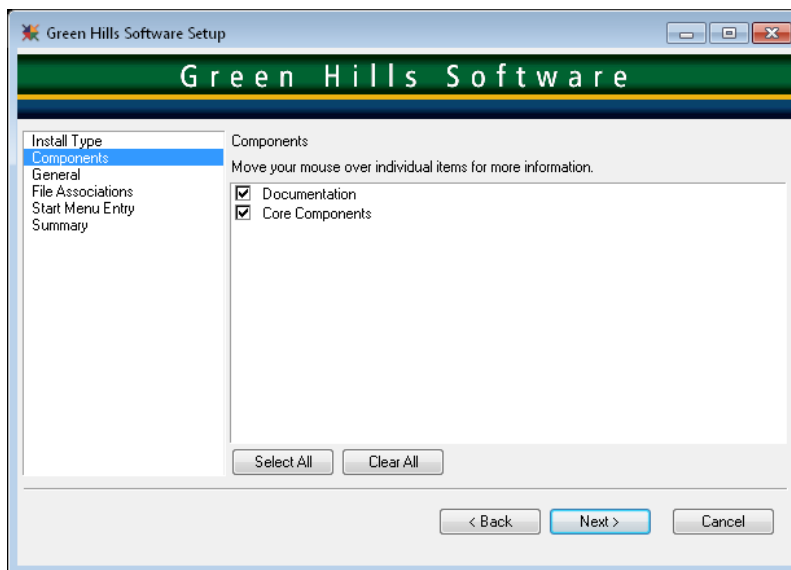
1. Log on to the Wii U Home page of your local Nintendo developer support group website, and then click Environment.
2. Download the latest version of the Green Hill Software MULTI 5.3.XX package.
3. Download the MULTI License package.
4. Extract both zip files to empty folders on your PC.
5. To install the Green Hill Software MULTI 5.3.XX package, double-click setup_windows.exe. If the Windows Security Warning dialog box is displayed, click **Run**.
6. When the *Green Hills Software Setup* dialog box is displayed, click **Next**.



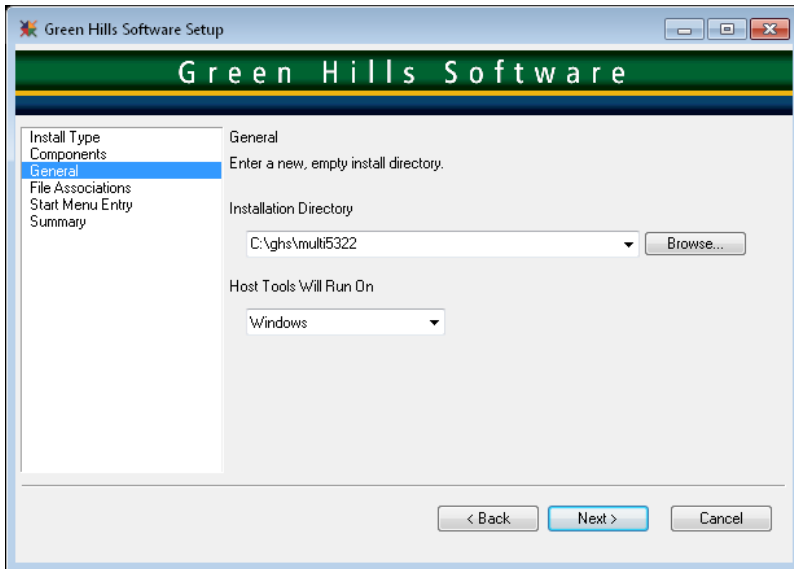
7. Ensure that the *New* radio button is selected, and then click **Next**.



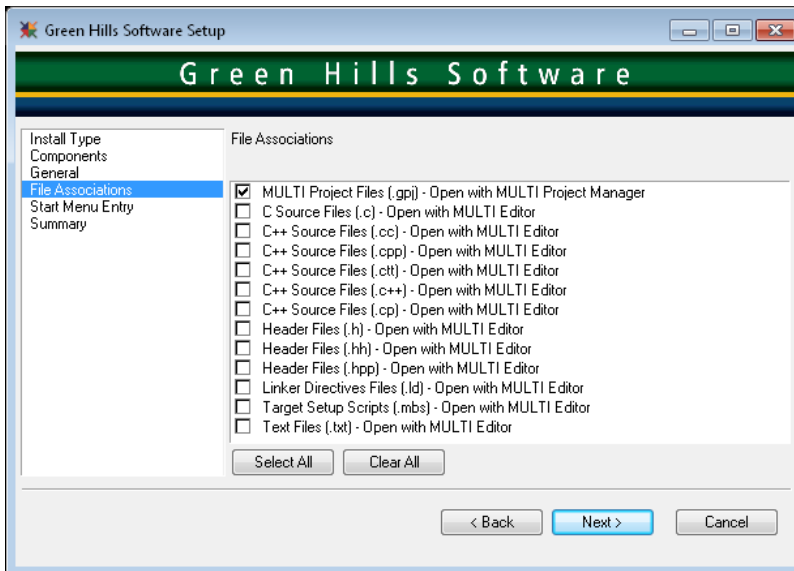
8. Ensure that the *Documentation* and *Core Components* check boxes are selected, and then click **Next**.



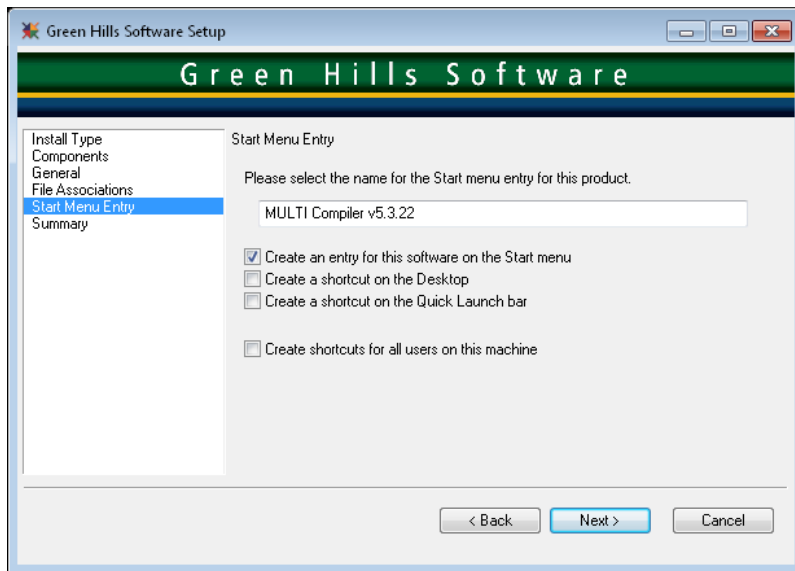
9. In the *Installation Directory* text box, type the path where MULTI will be installed, and then click **Next**. It is recommended that you use the default location, `C:\ghs\multi53xx`.



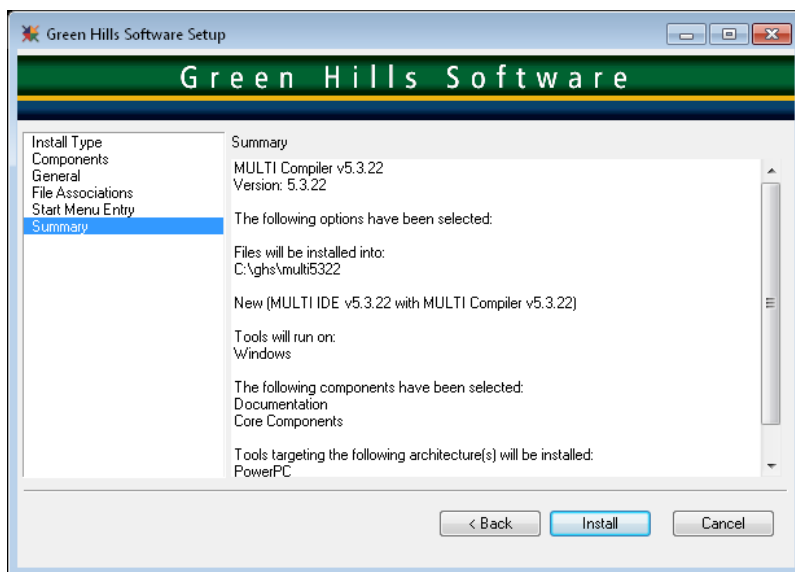
10. In the *File Associations* menu, click the check box to select or deselect file types that you want MULTI to open by default, and then click **Next**. It is recommended that you select only *MULTI Project Files*.



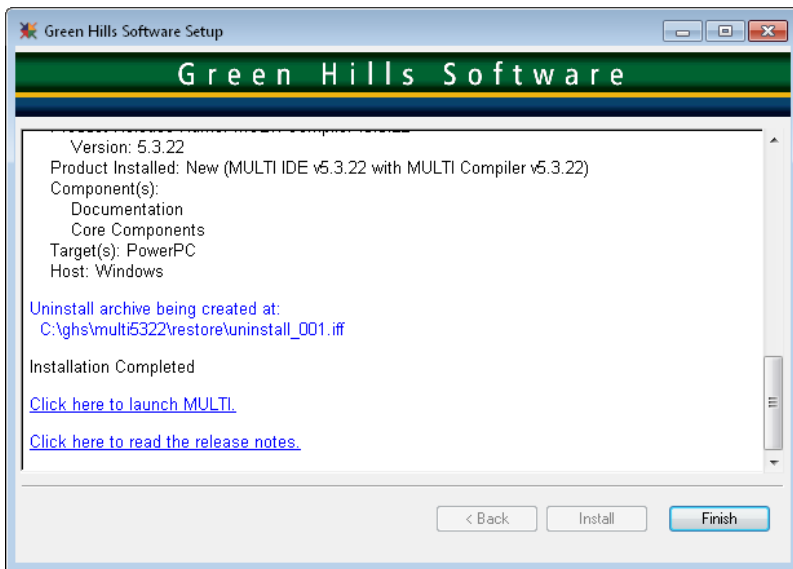
11. On the *Start Menu Entry* dialog box:
 - a. If you want to have MULTI added to the Start Menu, ensure that the check box is selected, and then type the name for the Start Menu entry in the text box.
 - b. If you want shortcuts on the desktop or Quick Launch bar, ensure that the appropriate check boxes are selected.
 - c. If you want shortcuts created for all users on the computer, ensure that the *Create shortcuts for all users* check box is selected.
 - d. Click **Next**.



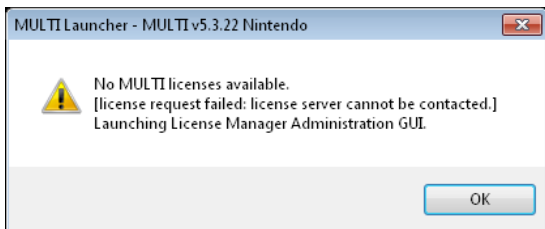
12. On the Summary page, click **Install**.



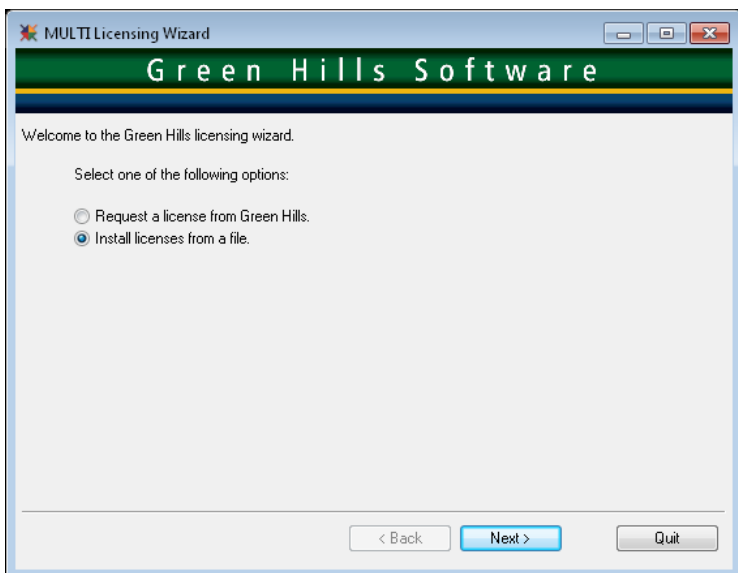
13. After the installation completes, click **Finish**.



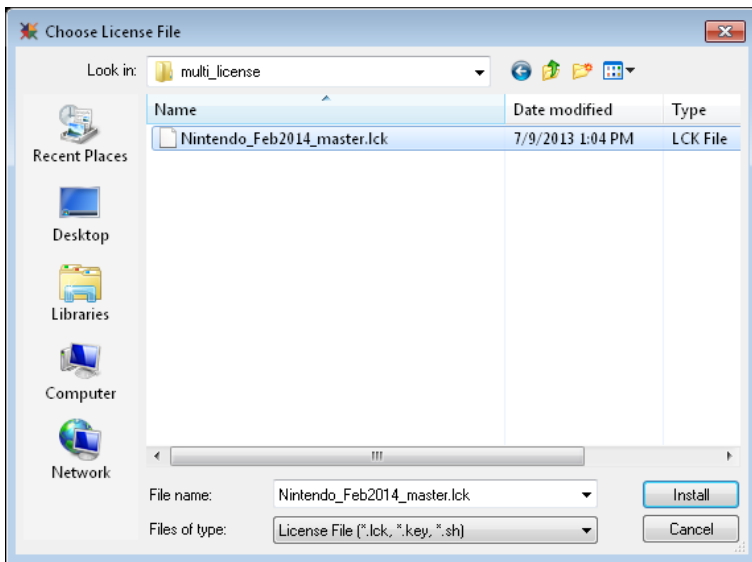
14. Start MULTI. The first time that you start MULTI, the MULTI Launcher warning dialog box is displayed. Click **OK**.



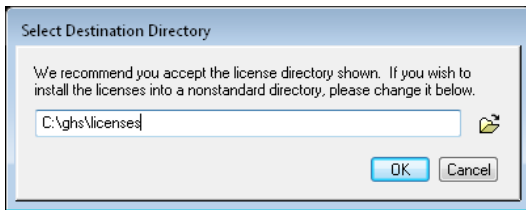
15. When the MULTI Licensing Wizard opens, select the *Install licenses from a file* button, and then click **Next**.



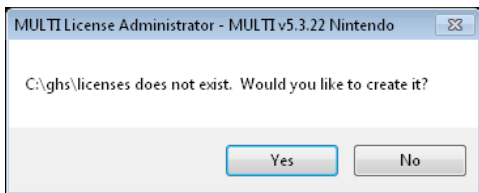
16. Locate and select the license file that you extracted in step 4, and then click **Install**.



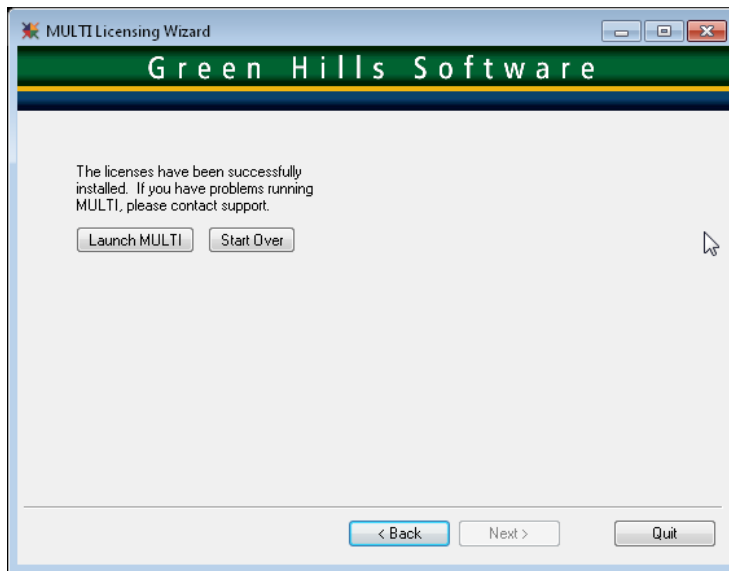
17. In the *Select Destination Directory* dialog box, type the location where you want MULTI to store the license, and then click **OK**.



18. If you are prompted to create the license folder, click **Yes**.



19. Click **Quit**.



Update MULTI Tool Version in `cafe.bat/cafex_env.bat`

The `cafe.bat/cafex_env.bat` scripts expect a specific version of MULTI as documented in the *Cafe SDK Release Notes*. If you have installed a later version of MULTI, and wish to avoid a warning message, update the MULTI version referenced in `cafe.bat/cafex_env.bat` to match the version of MULTI that you installed.

1. Open Notepad or other editor.
2. Click File, and then click Open.
3. Navigate to the location where you installed the Cafe SDK, and then double-click `cafe.bat/cafex_env.bat` to open it.
4. Find the line that says `set GHS_ROOT=C:\ghs\multi53xx`, where "53xx" corresponds to the expected version of MULTI such as "5319", and then change the version to match the version of MULTI that you downloaded and installed. For example, if you installed MULTI version 5.3.19, then change the version in the code to `set GHS_ROOT=C:\ghs\multi5319`.
5. Click File, click Save, and then close the editor.
6. A message is displayed confirming that the CAT-DEV name and IP address are set. These settings remain in effect until you change them.

Step 9: Set Up the Wii U GamePad for the CAT-DEV

The Wii U GamePad (DRC-DK) is the controller for Cafe system. It is equipped with an LCD display.

With the GamePad, developers may:

- Monitor video output.
- Monitor audio output.
- Use controller inputs.
- Use Rumble.
- Use camera input.
- Use microphone input.

NOTE

The quality of video and audio from the camera or microphone on the GamePad are subject to change.

Set Up DRC-DK MP

The CAT-DEV MP system includes the CAT-DEV MP console, DRC-DK MP or DRC-DK-TV, plus various CAT-DEV and DRC accessories.

CAUTION

Change only the connection settings as described here. Some changes to system settings may damage the GamePad, requiring that you return it to Nintendo for repair. Other changes to system settings may require that you use the *Wii U Menu Changer*, following the instructions in the *Wii U Menu Changer Readme* file to fix issues. Previous versions of the *DK Menu* may show an option to *Restore Factory Setting*. Do not select this option because, if selected, the DRC-DK may have to be returned to Nintendo for repair.

Power

The accessory kit includes an AC power adapter. To charge the DRC-DK MP battery, connect the AC adapter to the DRC-DK MP connection on the top left side of the DRC unit that is labeled *AC Adapter*, and then plug it in to an electrical outlet. After the battery is charged, the DRC-DK MP may be used without the AC adapter.

NOTE

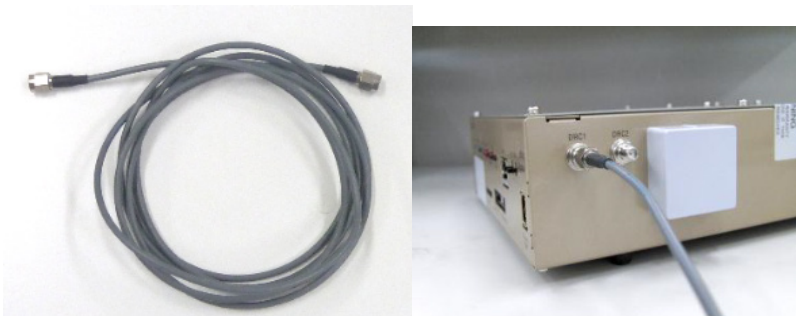
Do not remove the battery. The DRC-DK MP does not work without the battery.

Wired Connection

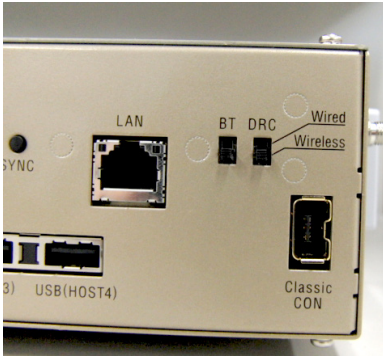
When using a wired connection, the DRC-DK MP is connected to the CAT-DEV using the provided coaxial cable.

To connect the DRC-DK MP to the CAT-DEV using a wired connection

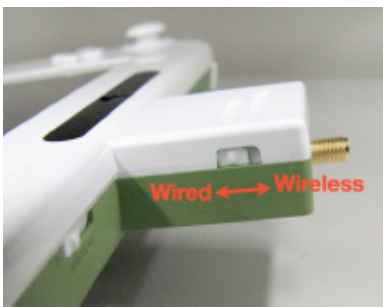
1. Connect one end of the coaxial cable to the coaxial connector on the DRC, and then connect the other end of the cable to the connector that is labeled *DRC1* on the CAT-DEV.



2. Set the slide switch on the front panel of the CAT-DEV that is labeled *DRC* to **Wired**.



3. Set the switch on the side of DRC coaxial connection to the position closer to the DRC body. The position closest to the DRC body is labeled **Wired**, and the other position is labeled **Wireless**.



4. To start the DRC in the *DK Menu*, press and hold the **L** Button and the **ZL** Button, and press the **POWER** Button.
5. When the *DK Menu* is displayed, use the **+Control Pad** to select *System Settings*, and then press the **A** Button.



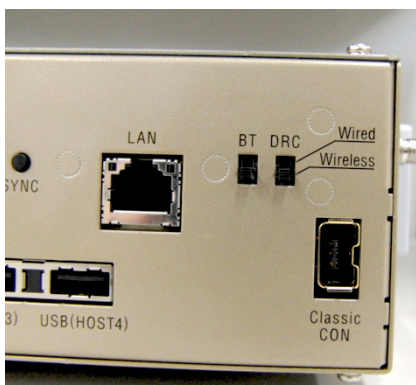
6. Ensure that *Connection* is selected, press **Left** or **Right** on the **+Control Pad** until *Wired* is displayed, and then press the **A** Button.



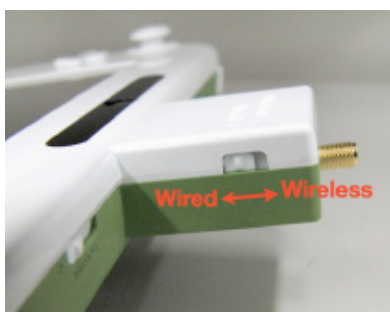
Wireless Connection

To connect the DRC-DK MP to the CAT-DEV using a wireless connection

1. Set the slide switch on the front panel of the CAT-DEV that is labeled *DRC* to **Wireless**.



2. Set the switch on the side of DRC coaxial connection to the position further from the DRC body. The position closest to the DRC body is labeled **Wired**, and the position further from the DRC body is labeled **Wireless**.



3. To start the DRC in the DK Menu, press and hold the **L** Button and the **ZL** Button, and press the **POWER** Button.
4. When the DK Menu is displayed, use the **+Control Pad** to select System Settings, and then press the **A** Button.



5. Ensure that *Connection* is selected, press **Left** or **Right** on the **+Control Pad** until *Wireless* is displayed, and then press the **A** Button.



Set Up DRC-DK-TV

DRC-DK-TV has essentially the same functions and interfaces as DRC-DK MP, with the following differences:

- The DRC-DK-TV also has the ability to output the image shown on an LCD display via HDMI cable.
- The DRC-DK-TV has a wired connection only, and no slide switch for changing from a wired connection to a wireless connection.
- The DRC-DK-TV does not have a battery. You must use the Wii U AC power adapter.
- Location of headphone jack moved from the upper side to the lower side on the DRC-DK-TV.



CAUTION

Do not change the *DK Menu* settings. Changing *DK Menu* settings, even after setup is complete, may cause FW update to break or fail. If you must modify *DK Menu* settings, use *Wii U Menu Changer*, following the instructions in the *Wii U Menu Changer Readme* file. Previous versions of the *DK Menu* may show an option to *Restore Factory Setting*. Do not select this option because, if selected, the DRC-DK may have to be returned to Nintendo for repair.

Power

The accessory kit includes an AC power adapter. Connect the DRC-DK-TV AC adapter to the connection that is labeled *AC Adapter* on the bottom right side of the DRC-DK-TV unit, and then plug it in to an electrical outlet. Since DRC-DK-TV does not have a battery, you cannot use it without the AC adapter.

NOTE

Do not use the DRC-DK MP AC adapter on the DRC-DK-TV unit. The connector for the DRC-DK MP AC adapter is sealed.



Wired Connection

The DRC-DK-TV is connected to the CAT-DEV using the provided coaxial cable. Since DRC-DK-TV is a *wired only* device, there is no need to change slide switch or software setting on the *DK Menu*.

To connect the DRC-DK-TV to the CAT-DEV

1. Connect one end of the coaxial cable to the coaxial connector on the DRC, and then connect the other end of the cable to the connector that is labeled *DRC1* on the CAT-DEV.



2. Set the slide switch on the front panel of the CAT-DEV that is labeled *DRC* to **Wired**.



HDMI Connection

DRC-DK-TV can output the image which is displayed on DRC LCD via the HDMI cable. If you connect DRC-DK-TV with the HDMI capture board, you may capture images or movies from DRC-DK-TV.

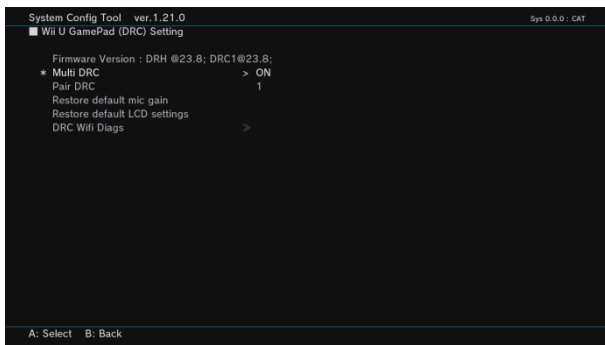


Pair the DRC

1. Navigate to the folder on the host PC where the Cafe SDK is installed, and then double-click `cafex_env.bat`.
2. At the command prompt, type `cafex on`, and then press ENTER.
 - If the *System Config Tool* is the default application, after a short wait, the *System Config Tool* is displayed on the television or monitor.
 - If the *System Config Tool* is not the default application, to start the *System Config Tool*, at the command prompt, type the following:

```
cafex
run %CAFE_ROOT%/data/mlc/sys/title/00050010/1f700500/code/system_config_tool.rpx
```

3. Using the Classic Controller Pro and the television or monitor, select the Wii U GamePad (DRC) Setting option, and then press the **A** Button.
4. In the Wii U GamePad (DRC) Setting menu, select the *Pair DRC* option, and then press the **A** Button.



5. Use the stylus to press the **SYNC** Button on the back of the GamePad.



6. A PIN code is displayed on the television or monitor.

- The PIN selection screen is displayed on the DRC screen. Use the touch panel to input the playing card suit sequence that is displayed on the television or monitor.



- After it is paired, the DRC automatically restarts. When the Root Menu is displayed again on the television or monitor, the pairing is complete. Confirm that the DRC has the correct firmware version installed.

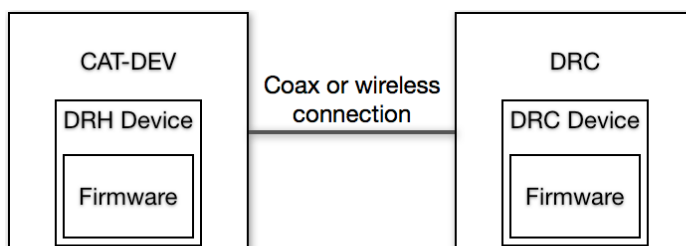
IMPORTANT

Do not modify any DRC settings via the DK Menu unless specifically instructed. If the **L** Button and the **ZL** Button are pressed when the GamePad is powered on, the GamePad boots in to the DK Menu. Improperly modifying the settings in this menu may render the GamePad unusable. The GamePad language and region settings are updated using the System Config Tool when the matching system settings are changed. Be sure to properly update and pair the GamePad before changing these system settings.

If the DRC displays the error [989133], **DO NOT** use the *Clear Wireless Settings* option in the *Restore Factory Settings* page of the *DK Menu*. Doing so renders the GamePad inoperable.

Update DRC Firmware

The wireless communication between the CAT-DEV and the GamePad (DRC) is performed on both devices by chips that contain firmware. The update process depends on the current configuration of your CAT-DEV and GamePad. It is recommended that GamePad firmware updates be performed in wired mode, if possible.

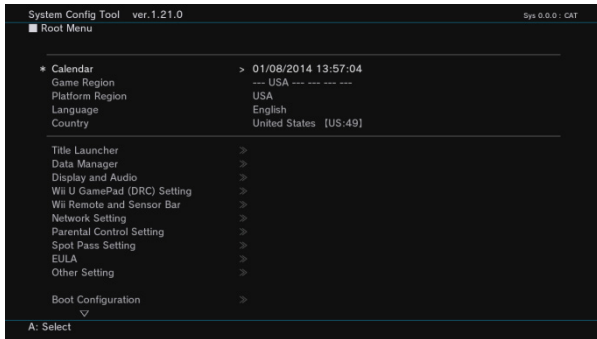


DRC: Display Remote Controller
DRH: DRC Host

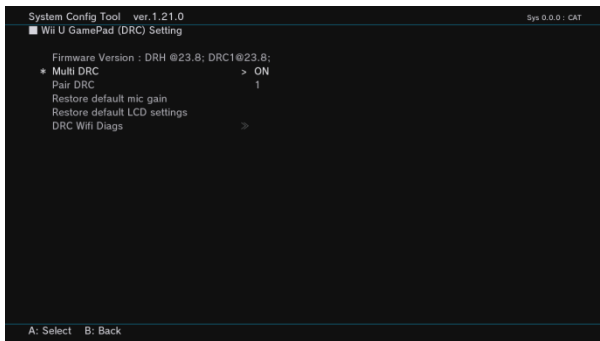
To update the GamePad firmware

- Ensure that the GamePad is turned on.

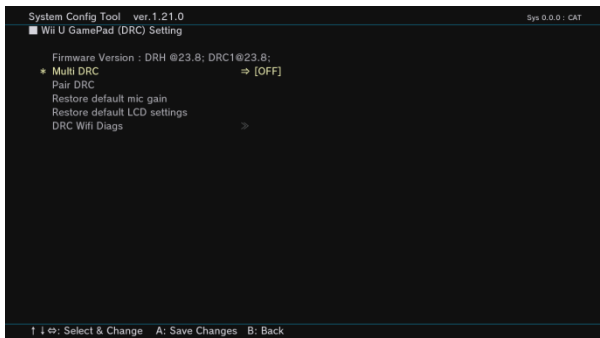
2. Using the Classic Controller Pro, in the *System Config Tool, Root Menu*, select the *Wii U GamePad (DRC) Setting* option, and then press the **A** Button.



3. If the *Update DRC Firmware* option:
 - a. **IS** available, go to the next step.
 - b. **IS NOT** available, the DRC may not be powered on. If the DRC is powered on and the *Update DRC Firmware* option is not available, the DRC firmware is up-to-date.



4. Select the *Update DRC Firmware* option, and then press the **A** Button on the Classic Controller Pro. The update starts. It may take several minutes for the update to complete, and the GamePad may power off at the end of the update.
5. The GamePad is now updated and the *Update DRC Firmware* option is no longer available.



6. You may need to pair the GamePad with the CAT-DEV again. Repeat the [Pair the DRC](#) steps.

Update DRC Firmware for SDK 2.10.03

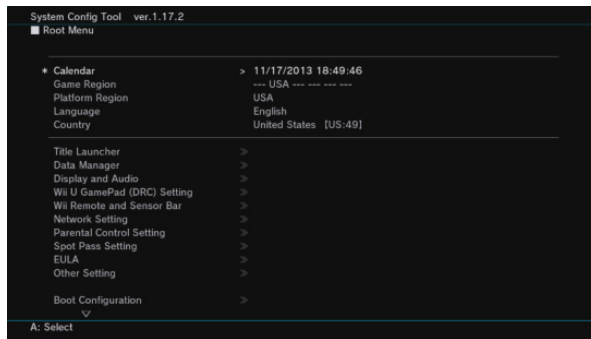
For SDK 2.10.03, CAT-DEV MP and DRC-DK MP / DRC-DK-TV use firmware version 23.8. The firmware configurations for DRH and DRC firmware are shown in the table below. The micro versions are now omitted in the *System Config Tool*.

Configuration	DRH version	DRC version
Factory shipping	11.0.4506	11.2.4736
SDK 2.03	11.3.4910	
SDK 2.04	16.1	
SDK 2.05	17.0	
SDK 2.06.00	19.1	
SDK 2.06.01	19.3	
SDK 2.06.03	20.7	20.6
SDK 2.08.07	21.16	
SDK 2.09.03	21.20	
SDK 2.09.04	21.24	
SDK 2.09.06	21.26	
SDK 2.09.09	21.30	
SDK 2.10.02	23.6	
SDK 2.10.03	23.8	

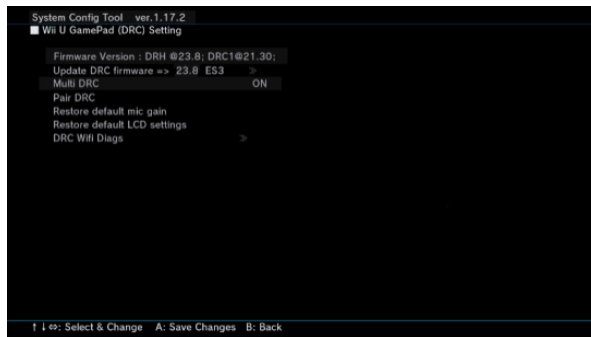
Confirm DRH Firmware Update

DRH firmware is now updated through the system update process. There is no explicit step to update the DRH firmware. Use *System Config Tool* to confirm that your DRH firmware is 23.8.

1. Using the Classic Controller Pro, in the *System Config Tool*, *Root Menu*, select the *Wii U GamePad (DRC) Setting* option, and then press the **A** Button.



2. Confirm that the DRH Firmware version is 23.8.



Use Your CAT-DEV

Start Up and Shut Down Your CAT-DEV

At this point, you have set up the CAT-DEV hardware, established communications between the host PC and the CAT-DEV, installed everything, set the default device, and paired the GamePad with the CAT-DEV.

When you turn your CAT-DEV on and press the **POWER** Button on the front, the blue *ON* light illuminates but nothing happens on your TV or monitor. This is because a CAT-DEV, right out of the box, is not configured to work without being attached to the host PC. While you may change this, we will not worry about it for now.

Right now, we will start up the CAT-DEV using the host PC and load the *System Config Tool*. The *System Config Tool* helps you pair your GamePad to the CAT-DEV, adjust system settings, and perform various other functions.

IMPORTANT: Unless you changed it, the CAT-DEV starts up with the display mode set to *AUTO*. This means that the system attempts to display the highest video setting possible (1080P HDMI), and goes down the list until it detects a valid setting. Ensure that only the video cable that you intend to use is plugged into the CAT-DEV and that your TV is set to the desired video option before turning the system ON.

To start up the CAT-DEV

1. Press the *ON/OFF* power switch on the side of the CAT-DEV to move it to the *ON* position. On the front of the CAT-DEV, the red *OFF* light is illuminated. Wait for the blue *STAT* light to be illuminated. This symbolizes that the system is idle and listening for commands.
2. On the host PC, navigate to the folder where you installed the Cafe SDK, and then double-click `cafex_env.bat`. The command shell opens.
3. At the command prompt, type `cafex on`, and then press ENTER. The blue *ON* light illuminates, and the Wii U logo appears on the TV screen. After a few seconds, the *System Config Tool* is displayed.

You may navigate the *System Config Tool* using a variety of controller types:

- GamePad, after it is paired with the CAT-DEV.
- Wii Remote, which may be synced with the CAT-DEV by pressing the **SYNC** Button on the front of the CAT-DEV and on the Wii Remote.
- Wii Classic Controller Pro, which is plugged directly into the *Classic CON* port on the CAT-DEV.
- USB keyboard, which is plugged into a USB connector on the CAT-DEV.
- The keyboard on the host PC when the command shell is the active window.

The *System Config Tool* starts in the Japanese language by default. Use the **+Control Pad** on any of the above controllers to highlight the *Language* option, and then press the **A** Button to select the option, and then use the **+Control Pad** to find your desired language. For more information about how to use the *System Config Tool* and the available options and settings, see ***Cafe SDK Basics* → *System Configuration Tool***.

To shut down the CAT-DEV

Similar to starting up the CAT-DEV, shutting down the CAT-DEV is done on the host PC. It is recommended that you exit applications and shut down the system as follows:

1. In your `cafex_env.bat` session, press CTRL-C to break the terminal connection.
2. At the command prompt, type `cafex stop`, and then press ENTER.
3. The CAT-DEV stops any running applications and then returns to the idle state. To turn the CAT-DEV completely off, return the *ON/OFF* power switch on the side of the system to the *OFF* position.

Build SDK Demos

The Cafe SDK contains sample demos that use *GNU make* as the build system. The demos are located in the `%CAFE_SDK%\system\src\demo` folder. Because the demos use *GNU make*, you must install either Cygwin or MinGW/MSYS to build the SDK demos. Steps are provided below.

Using Cygwin

Installing Cygwin

The distribution rights for Cygwin are such that users must retrieve the package from an approved mirror site.

NOTE

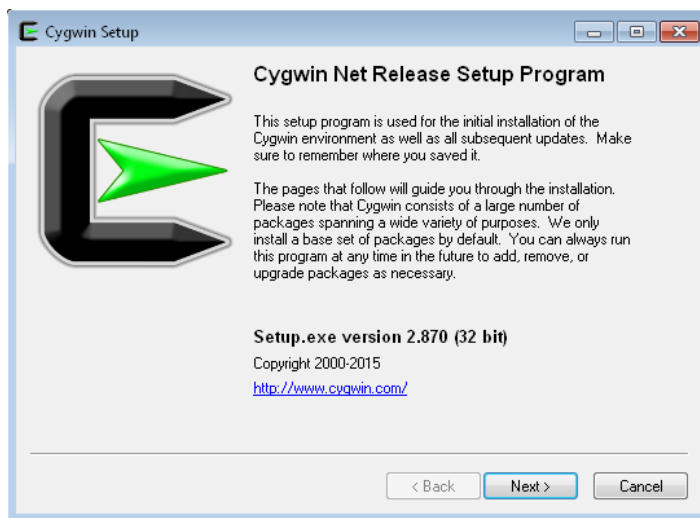
You must log on to the host PC with an administrator account to install and use the Cafe SDK. This ensures that the Cygwin file permissions are appropriately set for all SDK operations.

1. In a web browser, go to the Cygwin website (<http://cygwin.com/install.html>).
2. To download and install Cygwin, in the Installing and Updating Cygwin for 32-bit versions of Windows section, click `setup-x86.exe`, the 32-bit version of Cygwin.

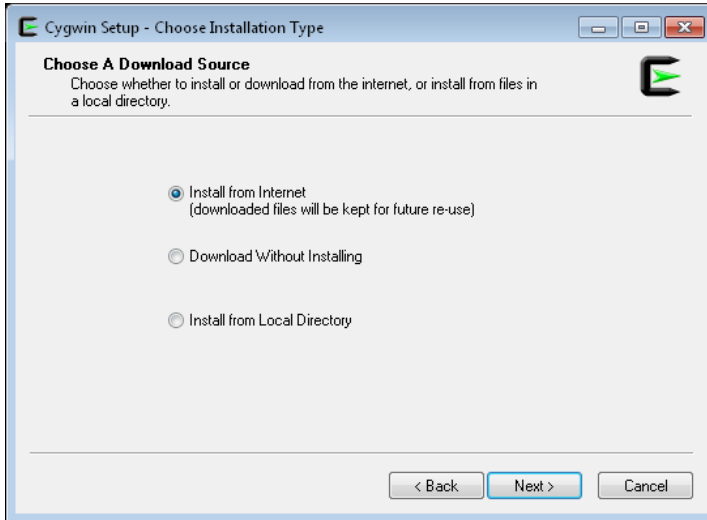
IMPORTANT

Do not attempt to install the 64-bit version of Cygwin.

3. In the Windows Security Warning dialog box, click Run. If another Windows Security Warning dialog box is displayed, click Run again.
4. In the Cygwin Setup dialog box, click Next.



5. Click to select *Install from Internet*, and then click **Next**.

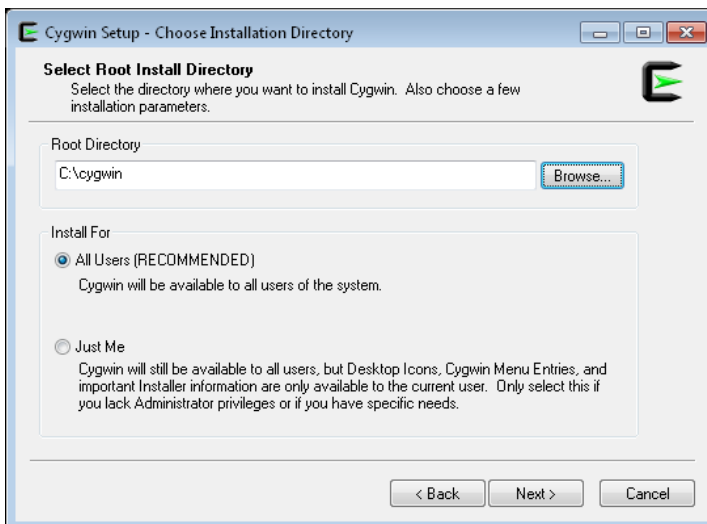


6. In the *Choose Installation Directory* dialog box:
 - a. In the *Root Directory* text box, type the path where you want to install Cygwin. It is recommended that you use the default path, `C:\cygwin`.

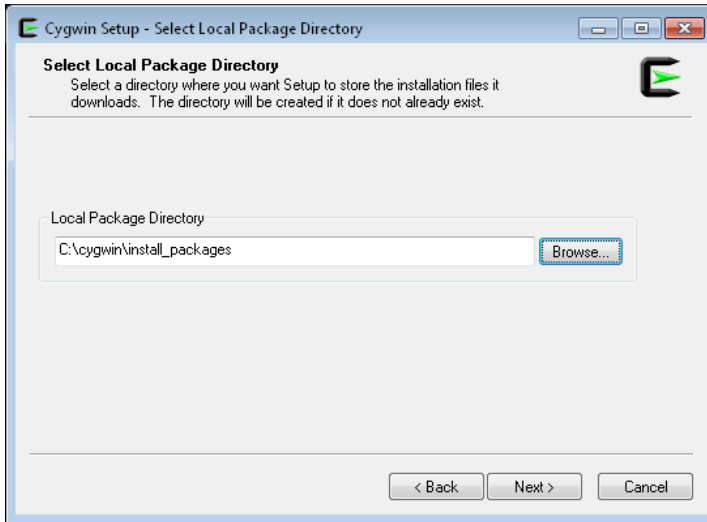
NOTE

If Cygwin is not installed at `C:\cygwin`, change the `CYGWIN_PATH` variable in `cafe.bat` to point to the correct directory. The path of the directory should not contain single-byte spacing.

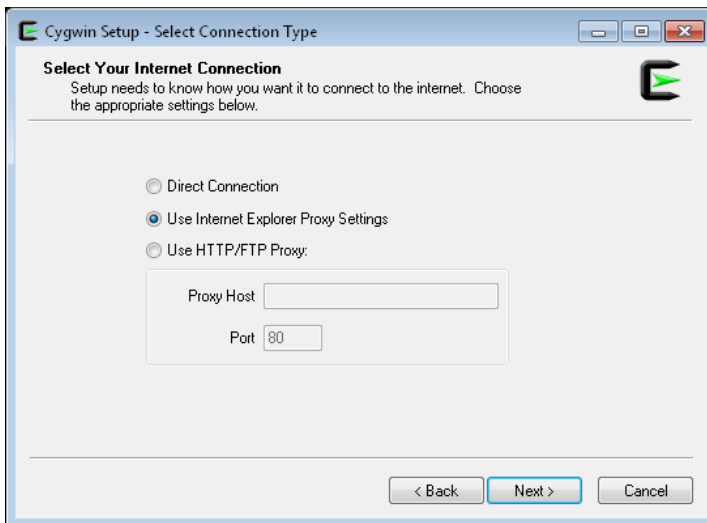
- b. To determine whether to install Cygwin for all users or just the current user, click to select the appropriate option. It is recommended that you install Cygwin for all users.
 - c. Click **Next**.



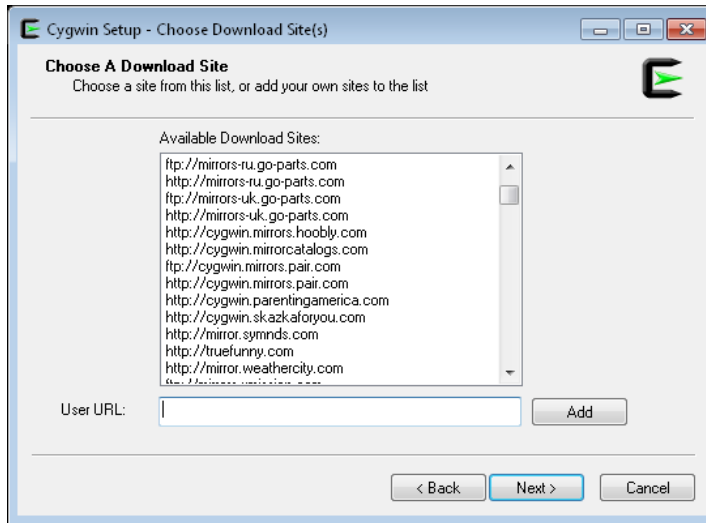
7. In the *Select Local Package Directory* dialog box, type the path where the installer saves the Cygwin installation files that are downloaded, and then click **Next**.



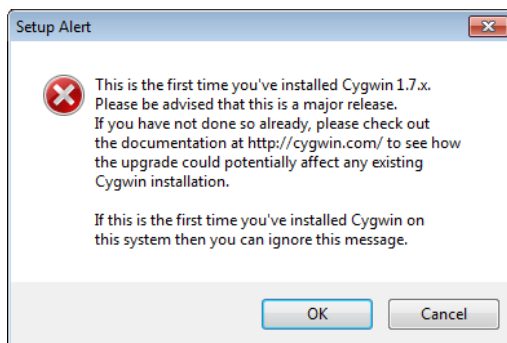
8. In the *Select Connection Type* dialog box, ensure that *Use Internet Explorer Proxy Settings* is selected, and then click **Next**.



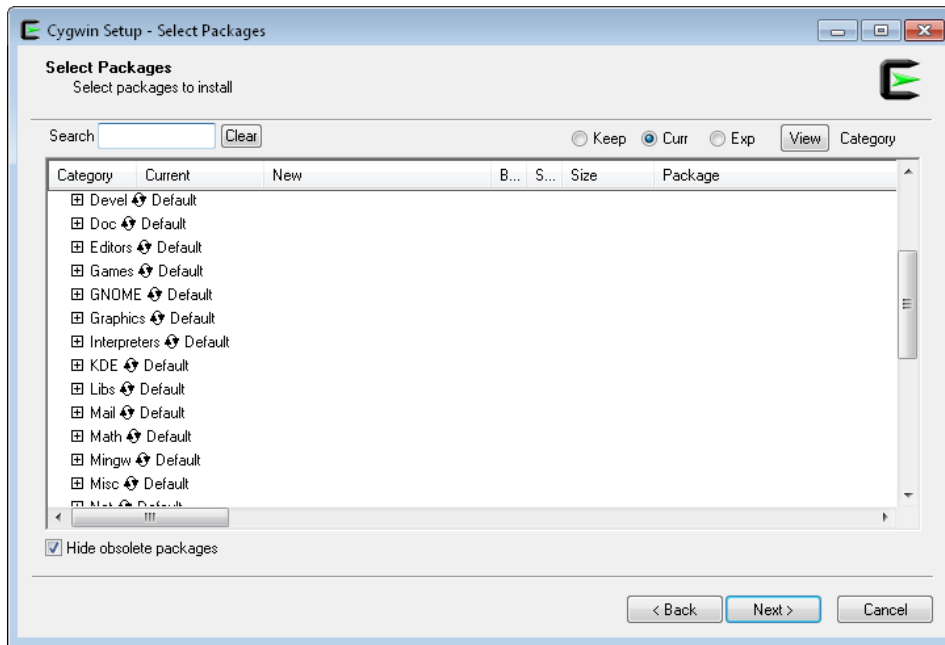
9. In the *Choose a Download Site* dialog box, select a site from the *Available Download Sites* menu, and then click **Next**. It does not matter which site you select.



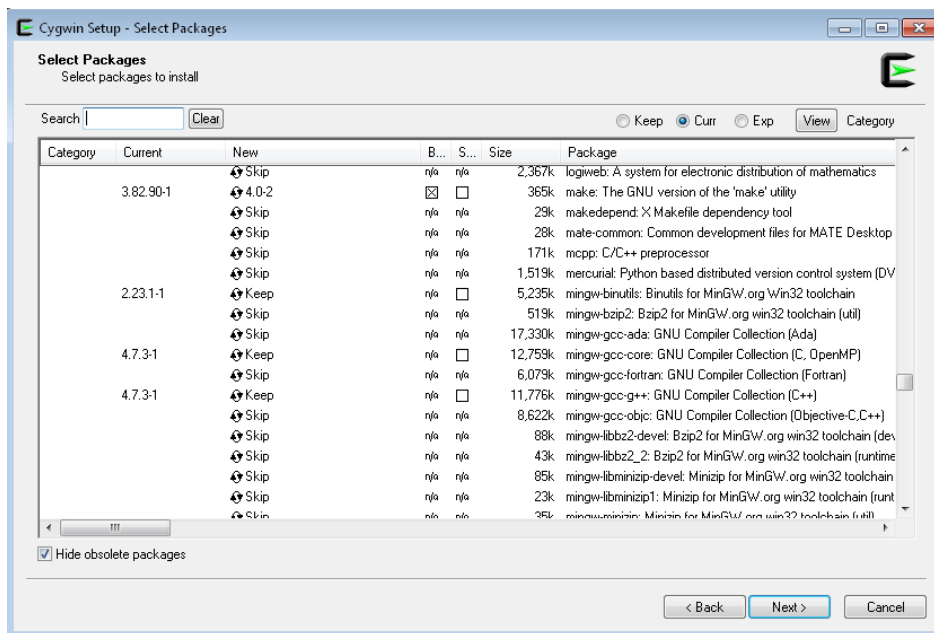
10. Cygwin gathers package information from the selected site. If a *Setup Alert* warning about Cygwin version 1.7.x is displayed, click **OK**.



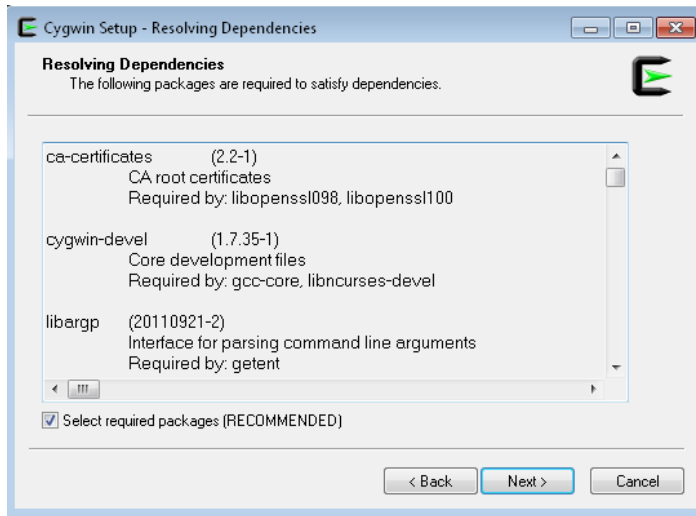
11. In the *Select Packages* dialog box, expand *Devel* ➤ *Default*.



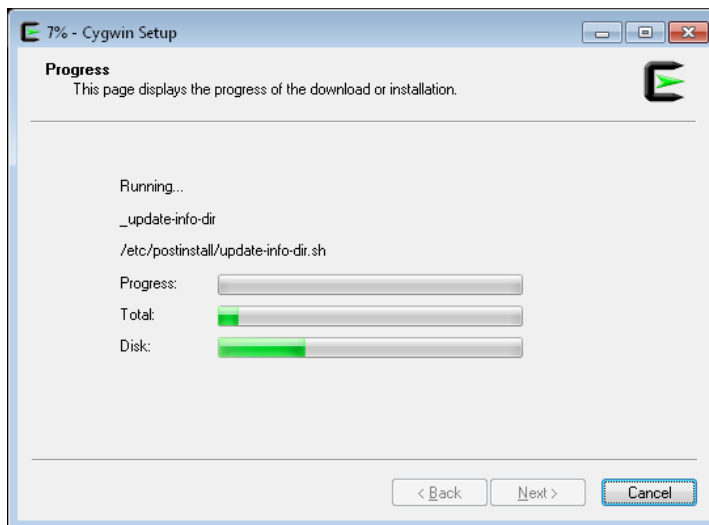
12. Ensure that the *make* package is selected for installation. If the entry in the *New* column is **Skip**, click **Skip** until it changes to **4.0-2**. Click **Next**.



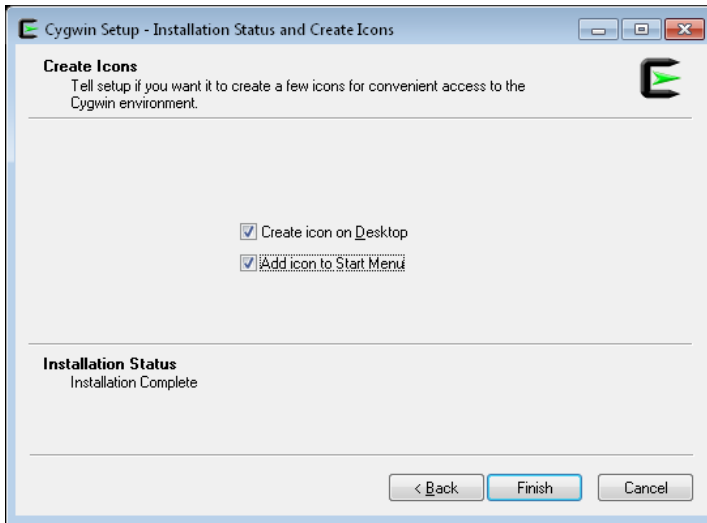
13. In the *Resolving Dependencies* dialog box, click **Next**.



14. The *Progress* dialog box is displayed.



15. Click to select the check boxes if you want to create an icon on the desktop or start menu.
Click **Finish**.



Building Using Cygwin

Use the following steps to build the *HelloWorld* demo.

1. Navigate to the folder where you installed the Cafe SDK.
2. Double-click `cafe.bat`.
3. At the command prompt, type the following command, and then press ENTER:

```
cd $CAFE_ROOT/system/src/demo/helloworld
```

4. At the command prompt, type `make`, and then press ENTER.

By default, the Cafe SDK builds debug versions of demos. To build a non-debug version, use the `make NDEBUG=TRUE` command. To remove object and dependency files, use the `make clean` command.

The process to build most of the demos is similar. For the GX2 demos, the assets must be built separately. If they are not built separately, the demos do not run correctly. To build the GX2 assets, navigate to `$CAFE_ROOT/system/src/demo/gx2/assets/geometries`, and then execute the `make` command. Repeat this process for the *shaders* and *textures* folders.

You may also build and run the demo in one step from the demo source directory.

1. Navigate to the folder where you installed the Cafe SDK.
2. Double-click `cafe.bat`.
3. At the command prompt, type the following command, and then press ENTER:

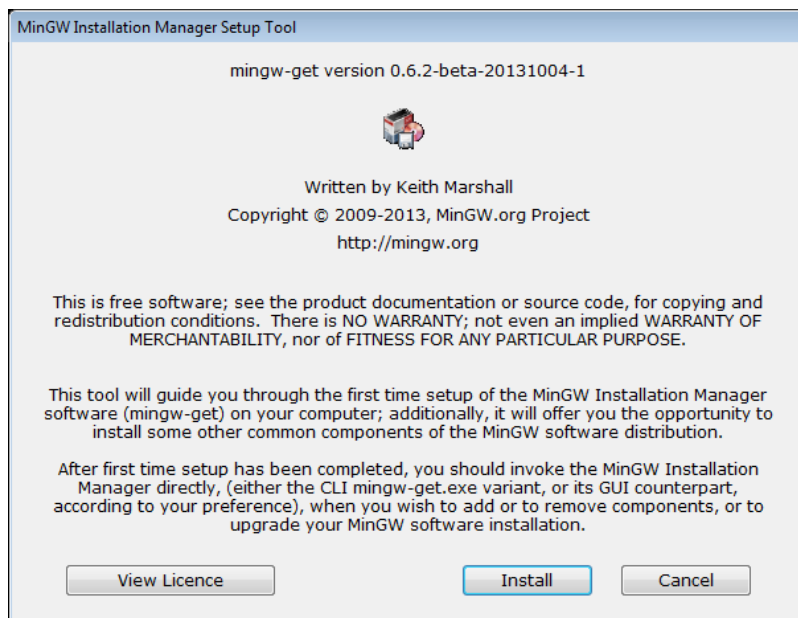
```
cd "$CAFE_ROOT/system/src/demo/helloworld"
```

4. At the command prompt, type `make run`, and then press ENTER.

Using MinGW/MSYS

Installing MinGW/MSYS

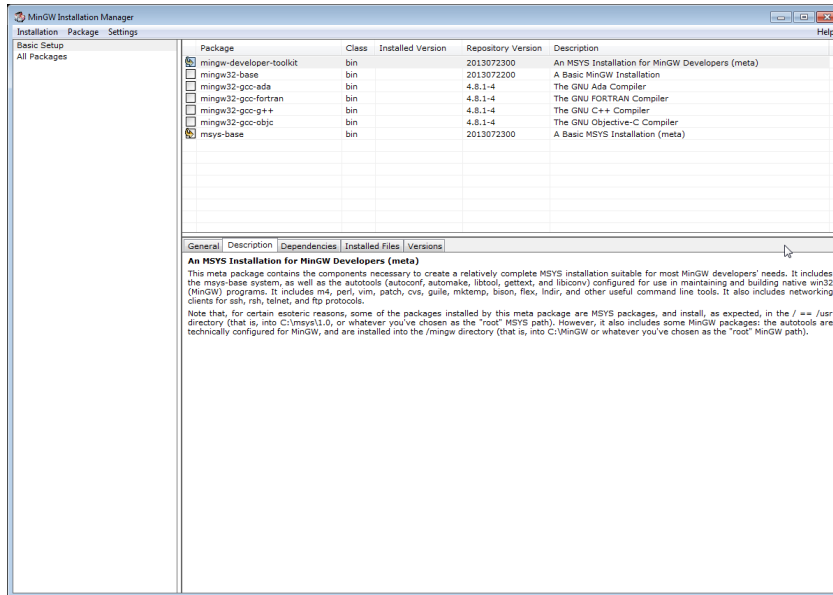
1. In a web browser, go to the MinGW website (http://www.mingw.org/wiki/Getting_Started).
2. To download and install MinGW, in the *Graphical User Interface Installer* section, click `mingw-get-setup.exe`. A command line installer is also available, but the GUI installer will be discussed in this document.
3. In the Windows Security Warning dialog box (when running in Internet Explorer), click **Run**. If another Windows Security Warning dialog box is displayed, click **Run** again.
4. When the installer appears, press the **Install** button, or view the license by clicking the **View Licence** button:



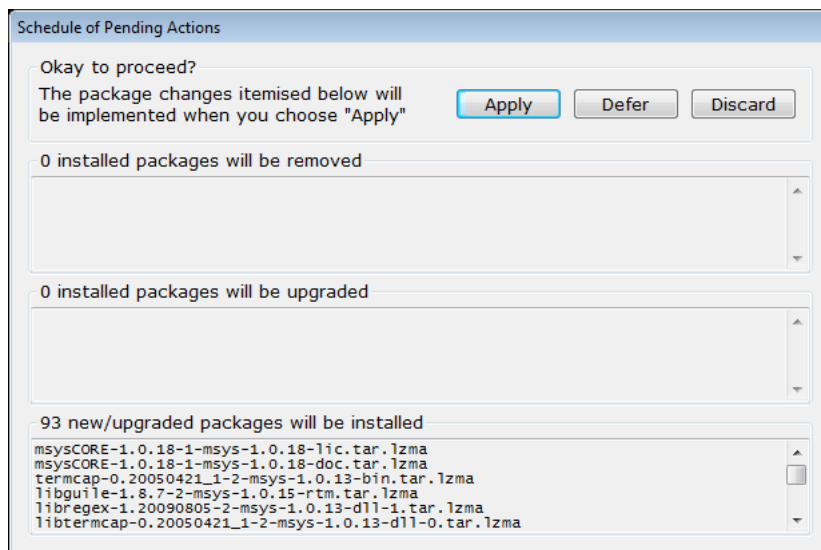
5. On the next scene, you are able to configure a few things about the installation. Please note that MinGW strongly advises against whitespaces in its install path. Once settings are selected, click **Continue**.



- MinGW will be installed. When installation has finished, press **Continue**. This will open the MinGW Installation Manager GUI.



- Select the box for mingw-developer-toolkit and select **Mark for Installation**. This will also mark msys-base.
- In the command box, select **Installation** and then **Apply Changes**.
- A new window will appear. Select **Apply** to begin downloading and installation of the packages.



- When installation is finished, close the installer.

Building using MinGW/MSYS

By default, the Cafe SDK builds debug versions of demos. To build a non-debug version, use the `make NDEBUG=TRUE` command. To remove object and dependency files, use the `make clean` command.

The process to build most other demos is similar. For the GX2 demos, the assets must be built separately. If they are not built separately, the demos do not run correctly. To build the GX2 assets, navigate to `$CAFE_ROOT/system/src/demo/gx2/assets/geometries`, and then execute the `make` command. Repeat this process for the *shaders* and *textures* folders.

You may also build and run the demo in one step from the demo source directory.

1. Navigate to the folder where you installed the Cafe SDK.
2. Double-click `cafe.bat`.
3. At the command prompt, type the following command, and then press ENTER:
4. `cd "$CAFE_ROOT/system/src/demo/helloworld"`
5. At the command prompt, type `make run`, and then press ENTER.

Using build_sdk_demo.bat

This batch file allows for the building of many demos without the need for Cygwin or MinGW/MSYS. This file is located at `%CAFE_ROOT%\system\src\demo\build_sdk_demo.bat`. To use it, copy and paste it to the source folder of the demo to build. For example, to build the helloworld demo:

1. Navigate to the folder where you installed the Cafe SDK.
2. Double-click `cafex_env.bat`.
3. At the command prompt, type the following command and press ENTER:

```
copy %CAFE_ROOT%\system\src\demo\build_sdk_demo.bat %CAFE_ROOT%\system\src\demo\helloworld
```

4. At the command prompt, type `cd system\src\demo\helloworld` and press ENTER.
5. At the command prompt, type `build_sdk_demo.bat` and press ENTER.

To build the NDEBUG version of the demo, open up the `build_sdk_demo.bat` file in a text editor and modify the line `if "%DEBUG%" == "" set DEBUG=DEBUG` to `if "%DEBUG%" == "" set DEBUG=NDEBUG`.

Alternatively, you can use the command `set DEBUG=NDEBUG` in the command prompt to get the same effect.

Run SDK Demos

1. Navigate to location where you installed the Cafe SDK.
2. Double-click `cafex_env.bat`.
3. At the command prompt, type the following command, and then press ENTER:

```
cd %CAFE_ROOT%\system\bin\ghs\cafe\demo\helloworld\DEBUG
```

4. At the command prompt, type the following command, and then press ENTER:

```
cafex run helloworld.rpx
```

5. In the command window, you should see output similar to the output the following screen capture. When the command prompt returns, the demo ran successfully, and exited.

```
Hello, Arguments!

argc: 1

argv[ 0] - 'helloworld.rpx'

My main() is at 0x200015C, my global at 0x10504648,528010

Total Cores == 3

Running Core == 1

OS Main Core == 1


Hello from Core 0!

Core 0 stack approx 0x10518008

Hello from Core 2!

Core 2 stack approx 0x10538008

End of demo

exited...

[+--*APPLICATION EXITED 0*--+]
```

NOTE

This demo does not output anything to the television or the GamePad.

Debug Your Application

You may debug your applications on a CAT-DEV by using the MULTI debugger that was installed along with the entire MULTI Toolchain from Green Hills Software during [CAT-DEV Install and Setup](#). The steps in the following sections demonstrate how to use the debugger.

To Debug Your Application

1. Navigate to location where you installed the Cafe SDK.
2. Double-click `cafex_env.bat`.
3. At the command prompt, type the following command, and then press ENTER:

```
cd %CAFE_ROOT%\system\bin\ghs\cafe\demo\helloworld\DEBUG
```

4. At the command prompt, type the following command, and then , and then press ENTER:

```
cafex run -d multi helloworld.rpx
```

5. In the command window, you should see debug output. Before the command prompt returns, you should see the message WAITING FOR DEBUGGER.

```
VPAD Init end, BPERF: (0/10746356) Title PID=15
```

```
ACP_AutoInit: start
```

```
00:00:10:783: ACP: No boot flag in RAM disk.
```

```
00:00:10:790: ACP: "find USB" flag is false.
```

```
ACP_AutoInit: ACPInitialize complete
```

```
ACP_AutoInit: ACPSaveDataInit complete
```

```
ACP_AutoInit: ACPNotifyPlayEvent complete
```

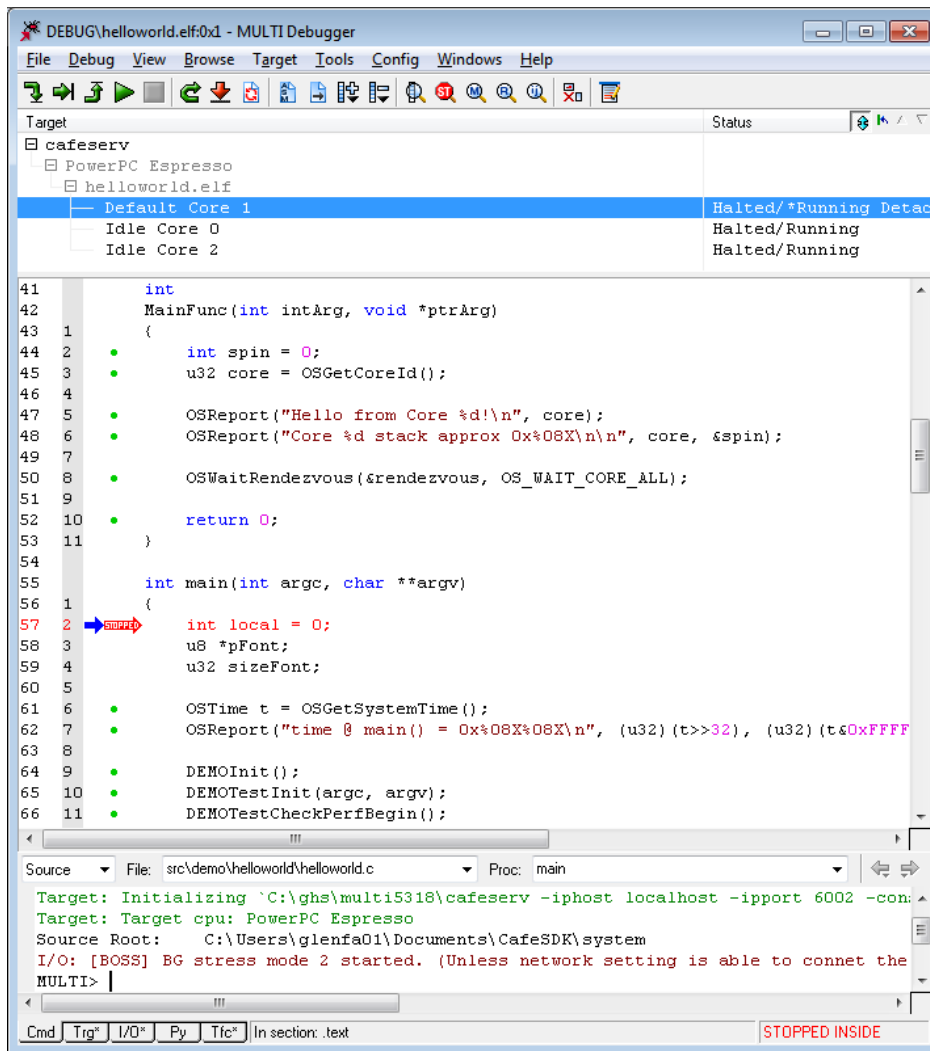
```
ACP_AutoInit: NDMInitialize complete
```

```
ACP: initialized
```

```
Wait for connection from debugger...
```

```
[+--*WAITING FOR DEBUGGER*--+]
```

6. After a short wait, the MULTI debugger starts. You can step through the demo.

**NOTE**

This demo does not output anything to the television or the DRC.

You may also build and debug the demo in one step from the demo source directory.

To Build and Debug Your Application in One Step

1. Navigate to the folder where you installed the Cafe SDK.
2. Double-click `cafe.bat`.
3. At the command prompt, type the following command, and then press ENTER:

```
cd "$CAFE_ROOT/system/src/demo/helloworld"
```

4. At the command prompt, type the following command, and then press ENTER:

```
make multirun
```

NOTE

Cygwin or MinGW/MSYS must be installed for this to command to work.

Serial Logging on the Wii U

You may review the logs leading up to a system hang or crash by viewing the system log in the *System Log Viewer* menu in the *System Configuration Tool*. The system has a circular log buffer of approximately 64KB that may still be available. However, there is a hardware issue that causes the log to be erased if you do not restart the system very quickly.

You may also obtain the log output via the serial logging interface on a CAT-R or a CAT-DEV that is in headless mode. With the serial logging interface, logs are output as they are printed from the application by using functions such as `OSReport`. When the USB-to-Serial adapter is connected the first time after a hang occurs, the system sends out any logs stored in the buffer.

This section discusses the serial logging process and provides information about the physical adapters and cables that are needed to perform serial logging on the Wii U.

For information about saving the system log (or syslog), see ***Cafe SDK Basics*** → ***Development Cycle*** → ***Debug Applications*** → ***Saving System Logs to an SD Card*** in the MAN pages.

Hardware

To connect the CAT-DEV to the host PC for serial logging, a USB-to-Serial adapter and a crossover cable are required. If the host PC does not have a serial port, an additional USB-to-Serial adapter is needed for the host PC.

USB-to-Serial Adapter

The Wii U does not have a serial port. There is also a high probability that the host PC does not have a serial port. Because of the simplicity of the RS232 standard, the Wii U uses a serial interface to dump logs. Not just any USB-to-Serial adapter works for this process.

Serial Adapter Chipsets

USB-to-Serial adapters are not simple cable rearrangements. They require a chip to convert from the serial interface (RS232) to the USB interface. There are two common chipsets in use to do this conversion. The first is the PL2303 family of chips made by Prolific. The second common chipset is the FT232 family of chips made by FTDI. These two companies do not make USB-to-Serial adapters; they manufacture the chips that are packaged in to many different retail adapters. When purchasing an adapter, it is very important to confirm which chipset that the adapter is based on.

Serial Adapter for the Wii U

The Wii U requires a USB-to-Serial adapter that uses the FTDI FT232B or FT232R chipset. Since the Wii U has drivers only for these chipsets and no other drivers may be installed, this is a hard requirement. For details on purchasing an FTDI serial adapter, contact the supplier of your choice.

The Gearmo PRO Single Port USB-to-Serial Adapter with Activity LED is recommended for a CAT-DEV. For purchasing details, contact the supplier of your choice.

The adapters shown in the table below have been tested and verified to work with CAT-DEV and CAT-R. There is no plan to support other adapters.

Table 1: USB-to-Serial Adapters

Make	Model	Chip Set
US232B/LC		
VSCOM	USB to RS-232 Cable	FTDI FT232B
QVS	USB to RS-232 Cable	FTDI FT232B

There is no plan for supporting other adapters.

CAUTION

If you are emulating a final production runtime environment, do not connect a USB-to-Serial adapter to the CAT-R. When the adapter is connected to the console display output, there is a small amount of system overhead added when the system loads, such as CPU utilization and MEM2 traffic.

NOTE

If OSReport output should exceed the rate that the debugging interface can handle, then messages may be dropped. This rare behavior is by design, ensuring that system performance is not adversely affected by blocking until the printing operation catches up. If this happens, the following message is printed:

```
***** log buffer overrun, some text was dropped *****
```

Serial Adapter for the Host PC

Because any driver may be installed on a PC, virtually any available USB-to-Serial adapter with any chipset should work on the host PC. USB-to-Serial adapters may be found for as little as a few dollars. However, some of the very inexpensive USB-to-Serial adapters claim to have the Prolific PL2303 chipset when they actually substitute a chipset that is distributed by another manufacturer. To work properly, these devices require an older version of the Prolific driver (3.2.0.0). Even with the older driver, they may not provide the desired performance. For example, some characters may be garbled. The older version of the driver is not plug-and-play via Windows Update and may be harder to find. When ordering a less expensive USB-to-Serial device with the Prolific chipset, ensure that a driver disc is included. After installing the driver, you may need to update the device driver version to 3.2.0.0 in the Windows Device Manager.

Cross-Over Cable

If you are using a USB-to-Serial adapter on the devkit and the host PC, you need a cross-over cable, also called a NULL Modem, to connect the two adapters. Cross-over cables swap the send and receive pins on one end of the serial connection, enabling the data that is sent from the devkit to be received by the host PC. It is very important that you do not simply purchase a serial extension cable, which does not swap these pins. A cross-over cable may be purchased inexpensively from many online retailers.

Software

Terminal emulation software is required on the host PC that is configured as follows:

Table 2: Terminal Software Configuration

Speed	57600 bps
Data	8-bit
Parity	none
Stop	1-bit
Flow Control	none
Terminal New-line	CR+LF

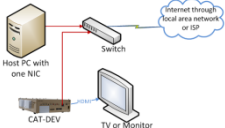
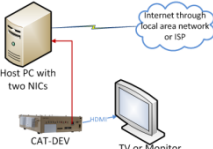
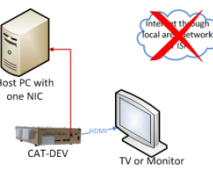
A small, stand-alone program is provided that automatically configures the terminal emulation software as specified, logs all output, and saves the output to a file on request. You may find the program in the `$CAFE_ROOT/system/tool/CatLog` directory.

Troubleshooting Serial Logging

Receive limited or no log output

When limited or no log output is received from a devkit, the most likely cause is a connection problem. Confirm that all connectors are properly connected and working. After checking the connections, verify that the *System Mode* is set to **Development Mode**. The *System Mode* may be configured in the *Boot Configuration* menu of the *System Config Tool*.

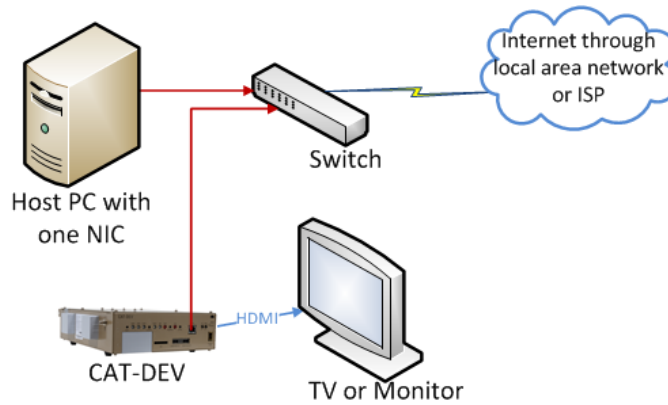
CAT-DEV Network Connection Configurations

Connection Method	Advantages	Disadvantages
<u>Unmanaged switch</u> (Preferred) 	- The connection between the host PC and the CAT-DEV are isolated from most LAN policies such as disabled DHCP, forbidden broadcast traffic, or restricted unicast traffic. - Isolates the connection from most LAN traffic. - The CAT-DEV is accessible from other hosts. - Simplest to configure.	- Other hosts may access the CAT-DEV. - Communication bandwidth may be impacted by other network traffic (such as HTTP or email) from the host PC. - Requires a reserved DHCP or static IP address from your IT department.
<u>Second NIC</u> 	- Isolates the connection from LAN policies such as disabled DHCP, forbidden broadcast traffic, or restricted unicast traffic. - Isolates the connection from other LAN traffic. - Communication bandwidth is maximized.	- IT policies and procedures may not allow this type of setup. - The second NIC requires a PCI slot or other high-speed I/O to maximize bandwidth. - The CAT-DEV is not easily accessible from other hosts. - You must ensure that the IP address of the second NIC does not conflict with an existing IP address on the LAN. - Setup and configuration are more complex.
<u>Direct connection</u> 	- Isolates the connection from certain LAN policies and traffic. - Does not require a reserved DHCP or static IP address from your IT department. - Communication bandwidth is maximized.	- The host PC is isolated from the LAN and the Internet. - Other hosts cannot access the CAT-DEV. - Setup and configuration are more complex.

For information about how to use the Host Bridge software, see [Using Host Bridge Software](#).

Unmanaged Switch Connection (Preferred)

In the following steps, you will set up your CAT-DEV system using a host PC and a gigabit switch on a local area network (LAN).



Host PC with a single NIC and CAT-DEV that are connected to the Internet through a switch.

NOTE

For this connection method, you must obtain a reserved DHCP or static IP address for your CAT-DEV from your IT department.

NOTE

The LAN port on the CAT-DEV is only for communication with the host PC. You may not connect the CAT-DEV directly to the Internet from this port. If you want to connect to the Internet from the CAT-DEV, you must use a router with a wireless connection or a Wii LAN adapter connected to a USB port.

Set Up Your CAT-DEV Hardware

To set up the CAT-DEV hardware using an unmanaged switch

1. Using a CAT5e Ethernet patch cable, connect the LAN port on the CAT-DEV to a port on a gigabit Ethernet (GigE) switch that is also connected to your local area network (LAN). To obtain gigabit speed on your CAT-DEV network, ensure that the NIC on the host PC, the Ethernet patch cable, and the unmanaged switch are all GigE capable.
2. Using a CAT5 Ethernet patch cable, connect the host PC to another port on the Ethernet switch, and then ensure that the switch is connected to the network.
3. Using an HDMI or other video cable, connect the CAT-DEV to a television or monitor.
4. Using the power cable, plug the CAT-DEV in to an electrical outlet.
5. Configure the NIC on the host PC following the instructions provided by your IT department.
6. To turn the CAT-DEV on, press the switch on the side of the CAT-DEV. The system turns on in an idle state. The red OFF light on the front of the CAT-DEV is illuminated, but the ON light remains off. In this mode, the CAT-DEV is listening for commands from the PC, but is not actually running any applications.

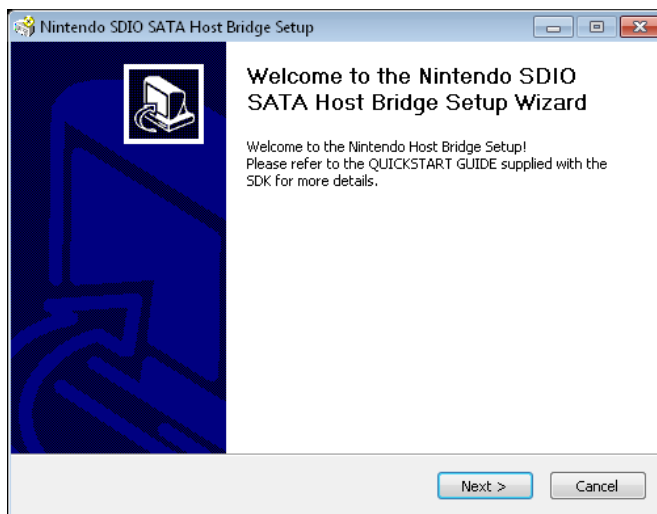
7. Wait at least one minute for the CAT-DEV to receive an IP address from the network.

Install Host Bridge Software

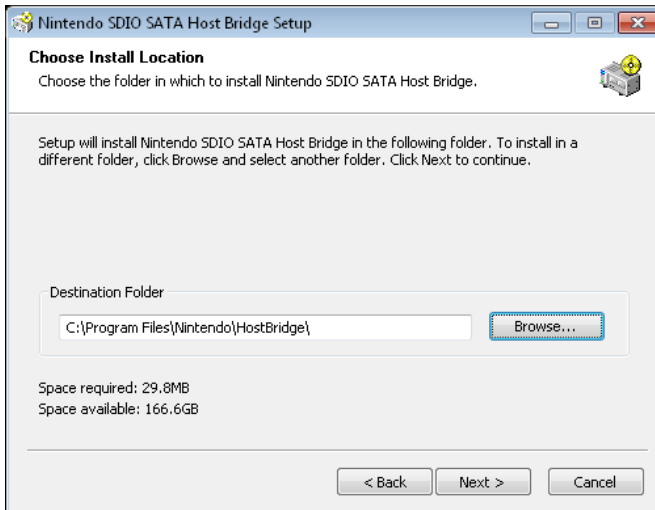
The Host Bridge software enables your host PC to communicate with the CAT-DEV. The installer file is provided outside of the Cafe SDK and must be downloaded separately. If the installer file is not available locally from a secondary source, log on to the Wii U Home page of your local Nintendo developer support group website, click **Cafe SDK**, and then scroll down to the **Misc** section. Download the latest version of the HostBridge Software package.

To install Host Bridge software on your host PC

1. Power on your CAT-DEV.
2. Extract the Host Bridge zip files to an empty folder on your PC.
3. Navigate to the folder where you extracted the HostBridge files, and then double-click HostBridgeSetup_3.2.x.x.exe. The Nintendo SDIO SATA Host Bridge Setup wizard starts.
4. On the Welcome page, click Next.



5. On the *Choose Install Location* page, type the location where you want the Host Bridge software installed in the *Destination Folder* text box, and then click **Next**. It is recommended that you use the default installation directory, C:\Program Files\Nintendo\Hostbridge.

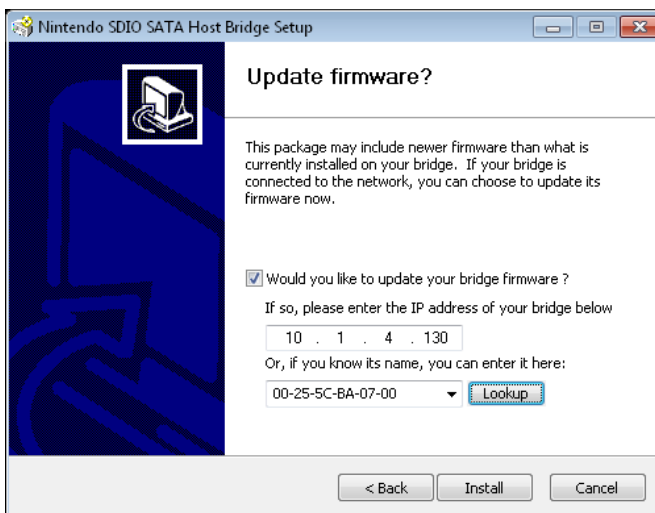


6. Note the MAC address on the sticker that is located on the opposite side of the CAT-DEV from the power switch. The MAC address is a 12-digit hexadecimal number, for example: 00-25-5C-BA-53-1D.

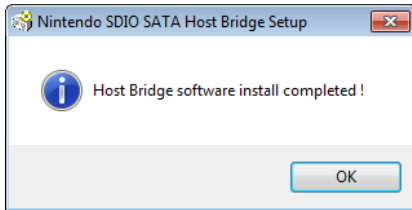
NOTE

It is possible for the CAT-DEV name to be something other than a 12-digit hexadecimal number. If this is the case, and you do not know the CAT-DEV name, the CAT-DEV name can be reset to a 12-digit hexadecimal number by holding down the **INIT** button on the front panel of the CAT-DEV for 5 seconds.

7. On the *Update firmware* page:
 - e. Ensure that the *Would you like to update your bridge firmware* check box is selected.
 - f. To find the IP address of your host bridge, type the CAT-DEV MAC address from the previous step in the text box beside the **Lookup** button, and then click the **Lookup** button. The IP address of your CAT-DEV is added automatically in the IP address text box.
 - g. Note the IP address. You will need it later.
 - h. Click **Install**.



- The host bridge firmware update takes a few minutes to complete. When the firmware update finishes, the *Host Bridge software install completed* dialog box is displayed. Click **OK**.

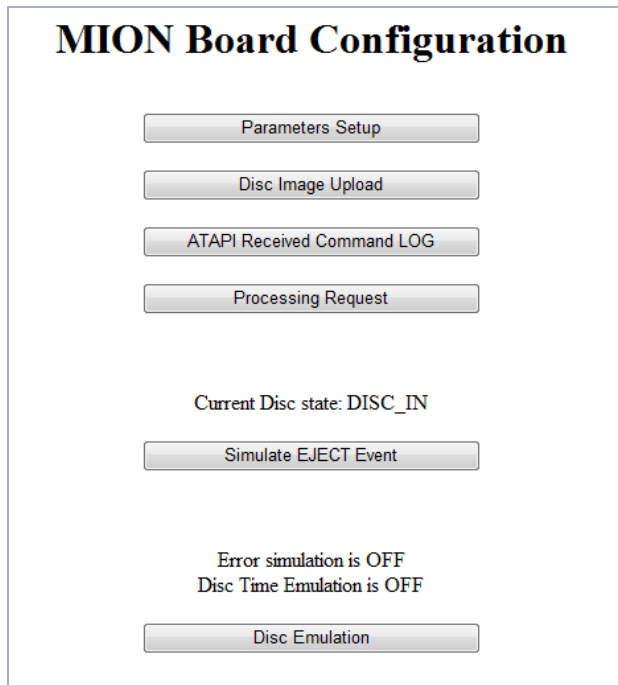


Set Up IP Addresses

For this connection method, you must obtain a reserved DHCP or static IP address from your IT department for the CAT-DEV. If you do not, there is a risk that the IP address on the CAT-DEV will change without notice, requiring you to discover the new IP address and repeat the steps to assign the IP address to the CAT-DEV.

To set up the IP address on your CAT-DEV

- In a web browser, type the CAT-DEV IP address that you noted previously in the address bar, and then press ENTER. This opens the *MION Board Configuration* page. Click **Parameters Setup**.



NOTE

If your network environment uses an HTTP proxy, you may need to add the IP address to the *Bypass Proxy* list in the host PC network settings. Contact your IT department for more information.

NOTE

If you are having trouble with the initial network setup, resetting the CAT-DEV to factory default settings may be helpful. It enables you to begin setting up your CAT-DEV again from a known configuration. For more information, see [Restore Factory Default Network Settings](#).

2. On the *MION Board Parameter Settings* page:
 - d. Type the static IP address that you obtained from IT for the CAT-DEV in the *IP Address* text box, click **DHCP OFF**, and then click **Write** to save your changes.

MION Board Parameter Settings

	IP Address 192.168.10.20
	Subnet Mask 255.255.255.0
	Default Gateway 0.0.0.0
	DHCP ☐ ON ☒ OFF

- e. To change the name of the CAT-DEV, type the new name in the *Machine Name* text box, and then click **Write** to save your changes. The name may be 254 characters or less, and contain only alphanumeric characters and hyphens.

Device Unique	Machine Name Hartley
	MAC Address 00-25-5C-BA-07-00
Write Form Reset	

NOTE

If you changed any IP-related settings that make the CAT-DEV inaccessible, including changing the IP Address, an error message is displayed, *Page cannot be displayed*, after you select **Write**. The saved changes **did** take effect. The error message is the result of changing the IP Address for the CAT-DEV, which requires that you enter in the new IP address in the address bar. Also, other network changes may have been made that require you to update network settings on the host PC.

- f. Close the *MION Board Parameter Settings* page.

3. Navigate to the folder where you installed the Cafe SDK, and then double-click `cafex_env.bat`. The command window opens and the following text is displayed.

```
=====

Welcome to the Nintendo CAFE!

=====

Environment initialized for this session only.

SDK_VER          = 2.11.03
CAFE_ROOT        = C:\Users\AUser\Desktop\cafe_sdk
CAFE_HARDWARE    = catdevmp
CAFE_BOOT_MODE   = PCFS
GHS_ROOT         = C:\ghs\multi5322
CAFE_GHS_VERSION = "v5.3.22 P0"
CAFE_CONTENT_DIR = C:\Users\AUser\Desktop\cafe_sdk\data\disc\content
CAFE_SAVE_DIR    = C:\Users\AUser\Desktop\cafe_sdk\data\save
CAFE_SLC_DIR     = C:\Users\AUser\Desktop\cafe_sdk\data\slc
CAFE_MLC_DIR     = C:\Users\AUser\Desktop\cafe_sdk\data\mlc
Current bridge   = Docs
Bridge IP Addr   = 10.1.4.130

-----
```


- As shown below, at the command prompt, type the following, and then press ENTER.

```
setbridge -default [bridge_name] [ip_addr]
```

where [bridge_name] is the case-sensitive name of the CAT-DEV, and [ip_addr] is the IP address that you obtained from IT for the CAT-DEV.

```
=====
Welcome to the Nintendo CAFE!
=====

Environment initialized for this session only.

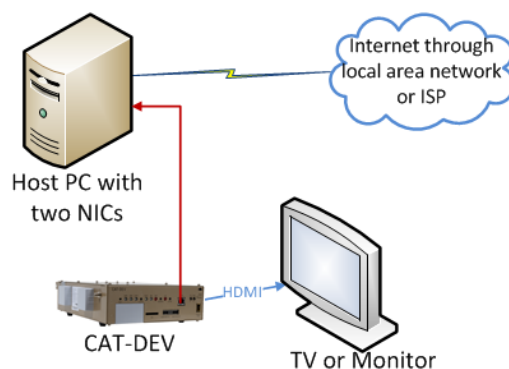
SDK_VER          = 2.11.03
CAFE_ROOT        = C:\Users\AUser\Desktop\cafe_sdk
CAFE_HARDWARE    = catdevmp
CAFE_BOOT_MODE   = PCFS
GHS_ROOT         = C:\ghs\multi5322
CAFE_GHS_VERSION = "v5.3.22 P0"
CAFE_CONTENT_DIR = C:\Users\AUser\Desktop\cafe_sdk\data\disc\content
CAFE_SAVE_DIR    = C:\Users\AUser\Desktop\cafe_sdk\data\save
CAFE_SLC_DIR     = C:\Users\AUser\Desktop\cafe_sdk\data\slc
CAFE_MLC_DIR     = C:\Users\AUser\Desktop\cafe_sdk\data\mlc
Current bridge   = Docs
Bridge IP Addr   = 10.1.4.130
-----

C:\Users\AUser\Desktop\cafe_sdk>setbridge -default mybridge 10.2.2.1
```

- Confirm that your network connection is valid by connecting to the MION page again. Open a web browser and then the IP address that you just set in the address bar. If this is successful, you may proceed to [Set the Default Device](#).

Second Network Interface Card (NIC)

In this scenario, the CAT-DEV is connected to the host PC through a second NIC on the host PC. This configuration helps maximize the bandwidth of the connection between the host PC and the CAT-DEV, and it isolates the connection from other LAN traffic.



Host PC with the primary NIC connected to the Internet and the secondary NIC connected to the CAT-DEV.

NOTE

The LAN port on the CAT-DEV is only for communication with the host PC. You may not connect the CAT-DEV directly to the Internet from this port. If you want to connect to the Internet from the CAT-DEV, you must use a router with a wireless connection or a Wii LAN adapter connected to a USB port.

Set Up Your CAT-DEV Hardware

To set up the CAT-DEV hardware using a host PC with two NICs

1. Install the second NIC on the host PC. Consult with your IT department when installing a second NIC on your host PC.
2. Using a CAT5 Ethernet patch cable, connect the primary NIC on the host PC to the network.
3. Configure the primary NIC on the host PC following the instructions provided by your IT department.
4. Using a CAT5E Ethernet patch cable, connect the LAN port on the CAT-DEV directly to the second NIC on the host PC. To obtain gigabit speed on your CAT-DEV network, ensure that the second NIC on the host PC and the Ethernet patch cable are GigE capable.
5. Using an HDMI or other video cable, connect the CAT-DEV to a television or monitor.
6. Using the power cable, plug the CAT-DEV in to an electrical outlet.
7. To turn the CAT-DEV on, press the switch on the side of the CAT-DEV. The system turns on in an idle state. The red OFF light on the front of the CAT-DEV is illuminated, but the ON light remains off. In this mode, the CAT-DEV is listening for commands from the PC, but is not actually running any applications.
8. Wait for one minute to allow the CAT-DEV time to *self-assign* an IP address.

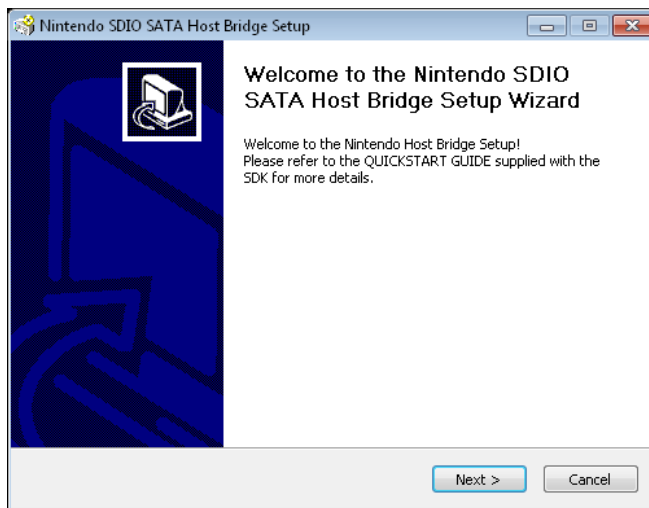
Install Host Bridge Software

The Host Bridge software enables your host PC to communicate with the CAT-DEV. The installer file is provided outside of the Cafe SDK and must be downloaded separately. If the installer file is not available locally from a secondary source, log on to the Wii U Home page of your local Nintendo developer support

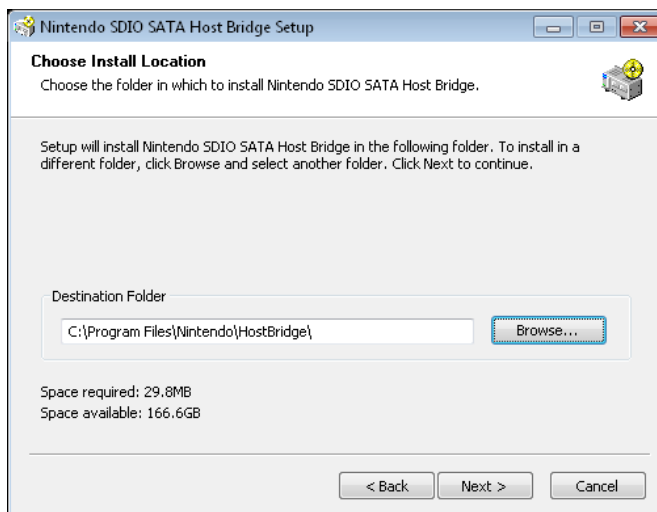
group website, click **Cafe SDK**, and then scroll down to the **Misc** section. Download the latest version of the HostBridge Software package.

To install Host Bridge software on your host PC

1. Power on your CAT-DEV.
2. Extract the Host Bridge zip files to an empty folder on your PC.
3. Navigate to the folder where you extracted the HostBridge files, and then double-click HostBridgeSetup_3.2.x.x.exe. The Nintendo SDIO SATA Host Bridge Setup wizard starts.
4. On the Welcome page, click Next.



5. On the *Choose Install Location* page, type the location where you want the Host Bridge software installed in the *Destination Folder* text box, and then click **Next**. It is recommended that you use the default installation directory, C:\Program Files\Nintendo\Hostbridge.

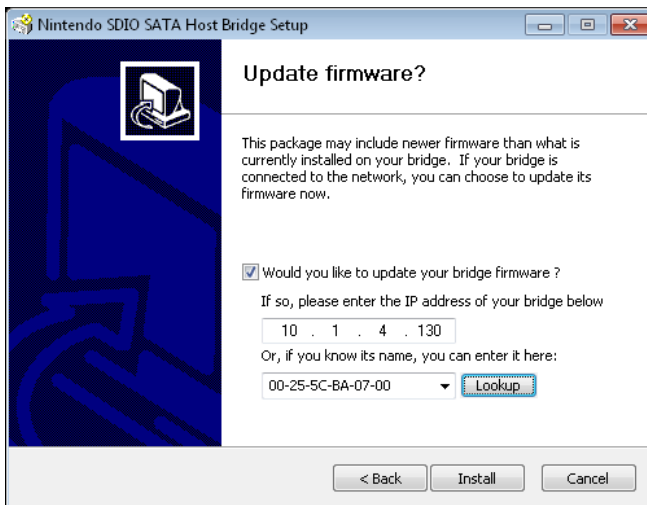


6. Note the MAC address on the sticker that is located on the opposite side of the CAT-DEV from the power switch. The MAC address is a 12-digit hexadecimal number, for example: 00-25-5C-BA-53-1D.

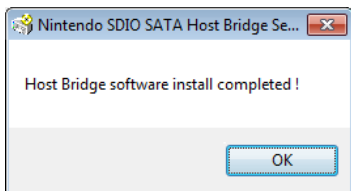
NOTE

It is possible for the CAT-DEV name to be something other than a 12-digit hexadecimal number. If this is the case, and you do not know the CAT-DEV name, the CAT-DEV name can be reset to a 12-digit hexadecimal number by holding down the **INIT** Button on the front panel of the CAT-DEV for 5 seconds.

7. On the *Update firmware* page:
 - a. Ensure that the *Would you like to update your bridge firmware* check box is selected.
 - b. To find the IP address of your host bridge, type the CAT-DEV MAC address from the previous step in the text box beside the **Lookup** button, and then click the **Lookup** button. The IP address of your CAT-DEV is added automatically in the IP address text box.
 - c. Note the IP address. You will need it later.
 - d. Click **Install**.



8. The host bridge firmware update takes a few minutes to complete. When the firmware update finishes, the *Host Bridge software install completed* dialog box is displayed. Click **OK**.



Set Up IP Addresses

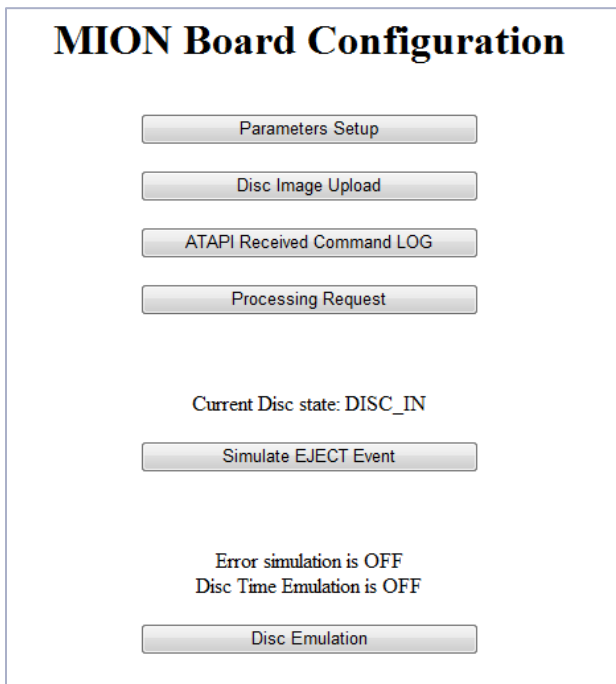
To set up the IP address on your CAT-DEV

1. Open a web browser, and then type `http://[ip_addr]` in the address bar, where `[ip_addr]` is the IP address that you noted previously for the CAT-DEV, and then press ENTER. The *MION Board Configuration* page opens. If you did not note the IP address previously, do the following:
 - a. On the host PC, navigate to the folder where you installed the Cafe SDK, and then double-click `cafex_env.bat`.
 - b. At the prompt, type `findbridge -all`, and then press ENTER. This starts search for all CAT-DEVs on your network.
 - c. When the search finishes, a list of all connected CAT-DEVs is displayed with the Bridge Name and IP address. The default Bridge Name for your CAT-DEV is the MAC address. Locate the correct Bridge Name and type the corresponding IP address in the address bar of the web browser.

NOTE

If you are having trouble with the initial network setup, resetting the CAT-DEV to factory default settings may be helpful. It enables you to begin setting up your CAT-DEV again from a known configuration. For more information, see [Resetting the CAT-DEV to Factory Default Settings](#).

2. On the *MION Board Configuration* page, click **Parameters Setup**.



3. On the *MION Board Parameter Settings* page, you may turn off DHCP and change the name of the CAT-DEV.

- a. To turn off DHCP, type 192.168.10.20 in the *IP Address* text box, click *DHCP OFF*, and then click **Write** to save your changes.

MION Board Parameter Settings

IP Address	192.168.10.20
Subnet Mask	255.255.255.0
Default Gateway	0.0.0.0
DHCP	☐ ON ☒ OFF

NOTE

It is not recommended that you use the Windows Automatic Private IP Addressing (169.254.x.x) for communications between the CAT-DEV and host PC.

- b. To change the name of the CAT-DEV, type the new name in the *Machine Name* text box, and then click **Write** to save your changes. The name may be 254 characters or less, and contain only alphanumeric characters. No special characters are allowed.

Device Unique	Machine Name Hartley
	MAC Address 00-25-5C-BA-07-00
Write Form Reset	

NOTE

If you changed any IP-related settings that make the CAT-DEV inaccessible, including changing the IP Address, an error message is displayed, *Page cannot be displayed*, after you select **Write**. The saved changes **did** take effect. The error message is the result of changing the IP Address for the CAT-DEV, which requires that you enter in the new IP address in the address bar. Also, other network changes may have been made that require you to update network settings on the host PC.

- c. Close the *MION Board Parameter Settings* page.
4. Set a static IP address for the NIC on the host PC that is connected to the CAT-DEV.
 - a. On the host PC, click **Start**, click **Control Panel**, click **Network and Internet**, and then click **Network Connection**.
 - b. Right-click the NIC to which the CAT-DEV is connected, and then click **Properties**.
 - c. Double click **Internet Protocol Version 4 (TCP/IPv4)**.
 - d. Click **Use the following IP address**, and then type the following IP address, subnet mask, and default gateway in the appropriate text boxes:

```
IP Address:      192.168.10.10
Subnet Mask:     255.255.255.0
Default Gateway: 192.168.10.1
```

5. Navigate to the folder where you installed the Cafe SDK, and then double-click `cafex_env.bat`. The command window opens and the following text is displayed.

```
=====

Welcome to the Nintendo CAFE!

=====

Environment initialized for this session only.

SDK_VER           = 2.11.03
CAFE_ROOT          = C:\Users\AUser\Desktop\cafe_sdk
CAFE_HARDWARE      = catdevmp
```

```
CAFE_BOOT_MODE      = PCFS
GHS_ROOT            = C:\ghs\multi5322
CAFE_GHS_VERSION    = "v5.3.22 P0"
CAFE_CONTENT_DIR    = C:\Users\AUser\Desktop\cafe_sdk\data\disc\content
CAFE_SAVE_DIR       = C:\Users\AUser\Desktop\cafe_sdk\data\save
CAFE_SLC_DIR        = C:\Users\AUser\Desktop\cafe_sdk\data\slc
CAFE_MLC_DIR        = C:\Users\AUser\Desktop\cafe_sdk\data\mlc
Current bridge      = Docs
Bridge IP Addr      = 10.1.4.130
```

6. As shown below, at the command prompt, type the following, and then press ENTER.

```
setbridge -default [bridge_name] [ip_addr]
```

where [bridge_name] is the case-sensitive name of the CAT-DEV, and [ip_addr] is the IP address for the CAT-DEV that you provided in step 3a (192.168.10.20).

```
=====
Welcome to the Nintendo CAFE!
=====

Environment initialized for this session only.

SDK_VER            = 2.11.03
CAFE_ROOT          = C:\Users\AUser\Desktop\cafe_sdk
CAFE_HARDWARE      = catdevmp
CAFE_BOOT_MODE     = PCFS
GHS_ROOT           = C:\ghs\multi5322
CAFE_GHS_VERSION   = "v5.3.22 P0"
CAFE_CONTENT_DIR   = C:\Users\AUser\Desktop\cafe_sdk\data\disc\content
CAFE_SAVE_DIR      = C:\Users\AUser\Desktop\cafe_sdk\data\save
CAFE_SLC_DIR       = C:\Users\AUser\Desktop\cafe_sdk\data\slc
CAFE_MLC_DIR       = C:\Users\AUser\Desktop\cafe_sdk\data\mlc
Current bridge     = Docs
```



```
Bridge IP Addr = 10.1.4.130
```

```
C:\Users\AUser\Desktop\cafe_sdk>setbridge -default mybridge 10.2.2.1
```

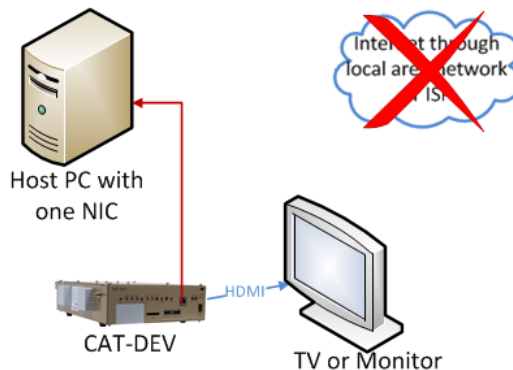
7. Confirm that your network connection is valid by connecting to the MION page again. Open a web browser and then the IP address that you just set in the address bar. If this is successful, you may proceed to [Set the Default Device](#).

Direct Connection

In this scenario, the CAT-DEV is directly connected to the host PC by a CAT5 Ethernet cable. This configuration may be useful for troubleshooting CAT-DEV issues.

NOTE

The LAN port on the CAT-DEV is only for communication with the host PC. You may not connect the CAT-DEV directly to the Internet from this port. If you want to connect to the Internet from the CAT-DEV, you must use a router with a wireless connection or a Wii LAN adapter connected to a USB port.



Host PC with one NIC that connects directly to the CAT-DEV.

To set up the CAT-DEV using a direct connection to the host PC

1. Configure the NIC on the host PC to use.
 - a. On the host PC, click **Start**, click **Control Panel**, click **Network and Internet**, and then click **Network Connection**.
 - b. Right-click the NIC to which the CAT-DEV is connected, and then click **Properties**.
 - c. Double click **Internet Protocol Version 4 (TCP/IPv4)**.
 - d. Click **Obtain an IP address automatically**.
2. Using a CAT5 Ethernet patch cable, connect the LAN port on the CAT-DEV directly to the NIC on the host PC. To obtain gigabit speed on your CAT-DEV network, ensure that the NIC on the host PC and the Ethernet patch cable are GigE capable.
3. Using an HDMI or other video cable, connect the CAT-DEV to a television or monitor.
4. Using the power cable, plug the CAT-DEV in to an electrical outlet.

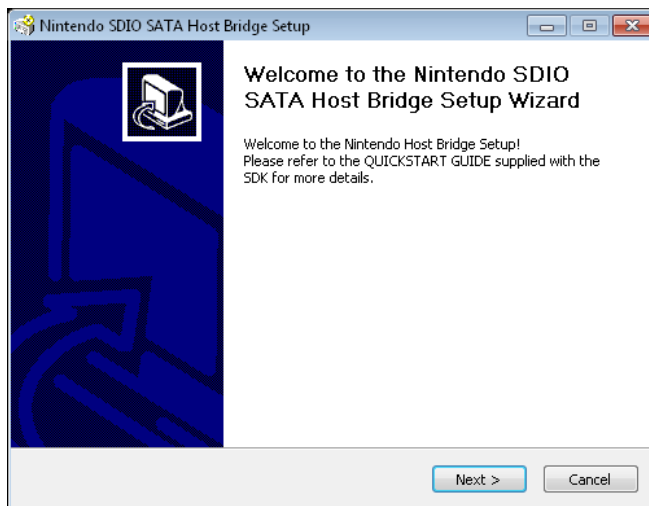
5. To turn the CAT-DEV on, press the switch on the side of the CAT-DEV. The system turns on in an idle state. The red OFF light on the front of the CAT-DEV is illuminated, but the ON light remains off. In this mode, the CAT-DEV is listening for commands from the PC, but is not actually running any applications.
6. Wait for one minute to allow the CAT-DEV time to *self-assign* an IP address.

Install Host Bridge Software

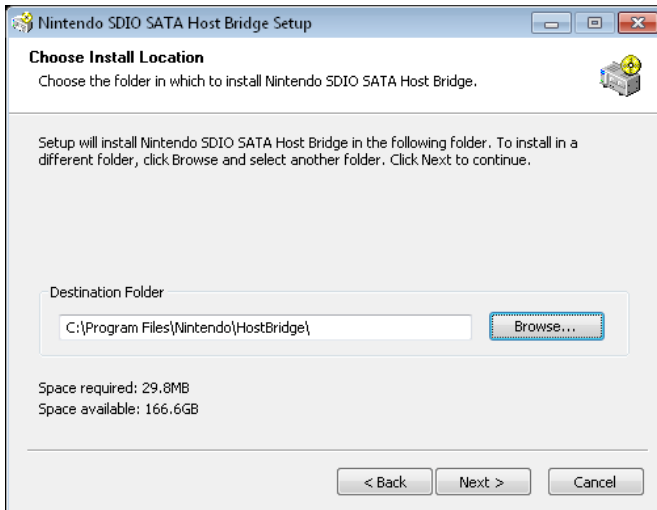
The Host Bridge software enables your host PC to communicate with the CAT-DEV. The installer file is provided outside of the Cafe SDK and must be downloaded separately. When you use the direct connection method, you do not have access to the Internet. You must obtain the Host Bridge software from the Wii U page on your local Nintendo developer support group website or from another source.

To install Host Bridge software on your host PC

1. Power on your CAT-DEV.
2. Extract the Host Bridge zip files that you obtained to an empty folder on your PC.
3. Navigate to the folder where you extracted the HostBridge files, and then double-click HostBridgeSetup_3.2.x.x.exe. The Nintendo SDIO SATA Host Bridge Setup wizard starts.
4. On the Welcome page, click Next.



5. On the *Choose Install Location* page, type the location where you want the Host Bridge software installed in the *Destination Folder* text box, and then click **Next**. It is recommended that you use the default installation directory, `C:\Program Files\Nintendo\Hostbridge`.

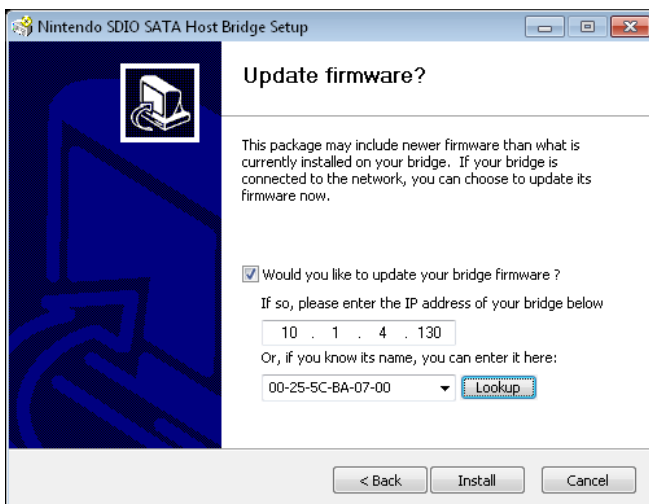


6. Note the MAC address on the sticker that is located on the opposite side of the CAT-DEV from the power switch. The MAC address is a 12-digit hexadecimal number, for example: 00-25-5C-BA-53-1D.

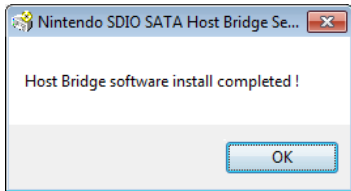
NOTE

It is possible for the CAT-DEV name to be something other than a 12-digit hexadecimal number. If this is the case, and you do not know the CAT-DEV name, the CAT-DEV name can be reset to a 12-digit hexadecimal number by holding down the **INIT** button on the front panel of the CAT-DEV for 5 seconds.

7. On the Update *firmware* page:
 - a. Ensure that the *Would you like to update your bridge firmware* check box is selected.
 - b. To find the IP address of your host bridge, type the CAT-DEV MAC address from the previous step in the text box beside the **Lookup** button, and then click the **Lookup** button. The IP address of your CAT-DEV is added automatically in the IP address text box.
 - c. Note the IP address. You will need it later.
 - d. Click **Install**.



8. The host bridge firmware update takes a few minutes to complete. When the firmware update finishes, the *Host Bridge software install completed* dialog box is displayed. Click **OK**.



Set Up IP Addresses

The system is now operational. However, it is highly recommended that you configure a static IP address for the CAT-DEV and host PC. This is because the self-assigned IP address may change each time the CAT-DEV is completely turned off via the Power Switch.

To set up the IP address on your CAT-DEV

1. Open a web browser, and then type `http://[ip_addr]` in the address bar, where `[ip_addr]` is the IP address that you found previously for the CAT-DEV, and then press ENTER. The *MION Board Configuration* page opens. If you did not note the IP address previously, do the following:
 - c. On the host PC, navigate to the folder where you installed the Cafe SDK, and then double-click `cafex_env.bat`.
 - d. At the prompt, type `findbridge -all`, and then press ENTER. This starts search for all CAT-DEVs on your network.

NOTE

If you are having trouble with the initial network setup, resetting the CAT-DEV to factory default settings may be helpful. It enables you to begin setting up your CAT-DEV again from a known configuration. For more information, see [Restore Factory Default Network Settings](#).

- e. When the search finishes, a list of all connected CAT-DEVs is displayed with the Bridge Name and IP address. The default Bridge Name for your CAT-DEV is the MAC address. Locate the correct Bridge Name and type the corresponding IP address in the address bar of the web browser.
2. On the *MION Board Configuration* page, click **Parameters Setup**.

MION Board Configuration

Current Disc state: DISC_IN

Error simulation is OFF
Disc Time Emulation is OFF

3. On the *MION Board Parameter Settings* page, you may turn off DHCP and change the name of the CAT-DEV.
 - a. To turn off DHCP, type 192.168.10.20 in the *IP Address* text box, click **DHCP OFF**, and then click **Write** to save your changes.

MION Board Parameter Settings

	IP Address 192.168.10.20
	Subnet Mask 255.255.255.0
	Default Gateway 0.0.0.0
	DHCP ☐ ON ☒ OFF

NOTE

It is not recommended that you use the Windows Automatic Private IP Addressing (169.254.x.x) for communications between the CAT-DEV and host PC.

- b. To change the name of the CAT-DEV, type the new name in the *Machine Name* text box, and then click **Write** to save your changes. The name must be 254 characters or less, and contain only alphanumeric characters or hyphens.

Device Unique	Machine Name Hartley
	MAC Address 00-25-5C-BA-07-00
Write Form Reset	

- c. Close the *MION Board Parameter Settings* page.
4. Set up a static IP address for the NIC on the host PC that is connected to the CAT-DEV.
 - a. On the host PC, click Start, click Control Panel, click Network and Internet, and then click Network Connection.
 - b. Right-click the NIC to which the CAT-DEV is connected, and then click Properties.
 - c. Double click Internet Protocol Version 4 (TCP/IPv4).
 - d. Click Use the following IP address, and then type the following IP address, subnet mask, and default gateway in the appropriate text boxes:

IP Address: 192.168.10.10
 Subnet Mask: 255.255.255.0
 Default Gateway: 192.168.10.1

5. Navigate to the folder where you installed the Cafe SDK, and then double-click `cafex_env.bat`. The command window opens and the following text is displayed.

```

=====
Welcome to the Nintendo CAFE!
=====

Environment initialized for this session only.

SDK_VER           = 2.11.03
CAFE_ROOT         = C:\Users\AUser\Desktop\cafe_sdk
CAFE_HARDWARE     = catdevmp
CAFE_BOOT_MODE    = PCFS
GHS_ROOT          = C:\ghs\multi5322
CAFE_GHS_VERSION  = "v5.3.22 P0"
CAFE_CONTENT_DIR  = C:\Users\AUser\Desktop\cafe_sdk\data\disc\content
CAFE_SAVE_DIR     = C:\Users\AUser\Desktop\cafe_sdk\data\save
CAFE_SLC_DIR      = C:\Users\AUser\Desktop\cafe_sdk\data\slc
CAFE_MLC_DIR      = C:\Users\AUser\Desktop\cafe_sdk\data\mlc
    
```

```
Current bridge    = Docs
Bridge IP Addr   = 10.1.4.130
-----
```

6. At the command prompt, type the following, and then press ENTER.

```
setbridge -default [bridge_name] [ip_addr]
```

where [bridge_name] is the case-sensitive name of the CAT-DEV, and [ip_addr] is the IP address for the CAT-DEV.

```
=====
Welcome to the Nintendo CAFE!
=====

Environment initialized for this session only.

SDK_VER           = 2.11.03
CAFE_ROOT         = C:\Users\AUser\Desktop\cafe_sdk
CAFE_HARDWARE     = catdevmp
CAFE_BOOT_MODE    = PCFS
GHS_ROOT          = C:\ghs\multi5322
CAFE_GHS_VERSION  = "v5.3.22 P0"
CAFE_CONTENT_DIR  = C:\Users\AUser\Desktop\cafe_sdk\data\disc\content
CAFE_SAVE_DIR     = C:\Users\AUser\Desktop\cafe_sdk\data\save
CAFE_SLC_DIR      = C:\Users\AUser\Desktop\cafe_sdk\data\slc
CAFE_MLC_DIR      = C:\Users\AUser\Desktop\cafe_sdk\data\mlc
Current bridge    = Docs
Bridge IP Addr    = 10.1.4.130
-----

C:\Users\AUser\Desktop\cafe_sdk>setbridge -default mybridge 10.2.2.1
```

7. Confirm that your network connection is valid by connecting to the MION page again. Open a web browser and then the IP address that you just set in the address bar. If this is successful, you may proceed to [Set the Default Device](#).

Using Host Bridge Software

The Host Bridge Software is a collection of tools that are installed on your host PC. This software communicates with your CAT-DEV device to upload files and programs and to send and receive debugging information.

Check the Version of the Host Bridge Software

To query the installed version of Host Bridge Software

1. Navigate to the folder where you installed the SDK, and then double-click `cafex_env.bat`.
2. At the command prompt type `hostdisplayversion`.

```
C:\Users\AUser\Desktop\cafe_sdk>hostdisplayversion

Bridge Type : MION

PLATFORM : cafe

Bridge PC Tools      : 3.2.5.7
Bridge Firmware     : 0.0.14.70
Bridge FPGA         : 1352071
```

Find the Name and IP Address of a Bridge

To query the name and IP address of the Host Bridge

1. Navigate to the folder where you installed the SDK, and then double-click `cafex_env.bat`.
2. To confirm the name and IP address when the IP address changes and the bridge configuration is out-of-date, at the command prompt, type `findbridge -all`, and then press ENTER. This starts a search for all CAT-DEVs on your network.
3. When the search finishes, a list of all connected CAT-DEVs is displayed with the Bridge Name and IP address. The default Bridge Name for your CAT-DEV is the MAC address.

```
C:\Users\AUser\Desktop\cafe_sdk>findbridge -all

Scanning for bridges on interface 10.1.4.254...

Bridge Name                               : IP Address
-----
00-25-5C-BA-53-1D                        : 10.1.4.195
```

4. Note the Bridge Name and IP Address.

Configure the CAT-DEV as the Default Device

1. Follow the steps in [Find the Name and IP Address of a Bridge](#).
2. At the command prompt, type the following, and then press ENTER.

```
setbridge -default [bridge_name] [ip_addr]
```

where [bridge_name] is the case-sensitive name of the CAT-DEV, and [ip_addr] is the IP address for the CAT-DEV.

```
=====
Welcome to the Nintendo CAFE!
=====

Environment initialized for this session only.

SDK_VER          = 2.11.03
CAFE_ROOT        = C:\Users\AUser\Desktop\cafe_sdk
CAFE_HARDWARE    = catdevmp
CAFE_BOOT_MODE   = PCFS
GHS_ROOT         = C:\ghs\multi5322
CAFE_GHS_VERSION = "v5.3.22 P0"
CAFE_CONTENT_DIR = C:\Users\AUser\Desktop\cafe_sdk\data\disc\content
CAFE_SAVE_DIR    = C:\Users\AUser\Desktop\cafe_sdk\data\save
CAFE_SLC_DIR     = C:\Users\AUser\Desktop\cafe_sdk\data\slc
CAFE_MLC_DIR     = C:\Users\AUser\Desktop\cafe_sdk\data\mlc
Current bridge   = Docs
Bridge IP Addr   = 10.1.4.130
-----

C:\Users\AUser\Desktop\cafe_sdk>setbridge -default mybridge 10.2.2.1
```

Update the Bridge Firmware Only

To update the bridge firmware of one or more host bridges

1. Navigate to the folder where you installed the SDK, and then double-click `cafex_env.bat`.
2. At the command prompt, type the following, and then press ENTER.

```
updatebridges.exe -a=[bridge_name] -x
```

where `[bridge_name]` is the case-sensitive name of the CAT-DEV.

```
C:\Users\AUser\Desktop\cafe_sdk>updatebridges.exe -a=Docs -x
```

```
UpdateBridges v1.0.0.11 - Copyright c Nintendo of America, Inc. 2012-2013
```

```
INFO: Parsing Input arguments...
```

```
INFO: Checking Dependencies...
```

```
INFO: Find Bridge app path      : C:\Program
Files\Nintendo\HostBridge\findbridge.exe
```

```
INFO: FSEMUL app path          : C:\Program
Files\Nintendo\HostBridge\FSEmul.exe
```

```
INFO: Mion button app path     : C:\Program
Files\Nintendo\HostBridge\MionButton.exe
```

```
INFO: Checking Parameters...
```

```
INFO: Target Firmware          : 0.00.14.70
```

```
INFO: Getting the Bridge Information for Docs...
```

```
INFO: Running C:\Program Files\Nintendo\HostBridge\findbridge.exe Docs,
Attempt: 1 of 10
```

```
List of Bridges that is being updated are:
```

```
Name                IPAddress
```

```
~~~~~              ~~~~~~
```

```
Docs                10.1.4.130
```

```
~~~~~ Start updating Bridge: 10.1.4.130 ~~~~~
```

```
INFO: Running FSEMUL -ver -ip 10.1.4.130
```

```
INFO: Running C:\Program Files\Nintendo\HostBridge\FSEmul.exe -ver -ip
10.1.4.130,
```

```
Attempt: 1 of 5
```

INFO: The Current Firmware version of the Bridge 10.1.4.130 is
0.0.14.70

Stopping Catdev for update

Resetting the CAT-DEV to Factory Default Settings

You may reset your CAT-DEV to factory default settings at any time, for any reason. If you are having trouble with the initial network setup, resetting the CAT-DEV to factory default settings may be helpful. It enables you to begin setting up your CAT-DEV again from a known configuration.

To reset the CAT-DEV settings to the factory default

1. Ensure that the CAT-DEV is idle. The ON/OFF switch on the side of the CAT-DEV is turned *ON*, the red *OFF* light is illuminated on the front of the CAT-DEV, and the blue *ON* light is not illuminated. In this mode, the CAT-DEV is listening for commands from the PC, but is not actually running any applications.
 - a. If the CAT-DEV is turned on and the blue *ON* light is illuminated, press the **POWER** Button located between the *OFF* and *CC* lights, and hold it until the *ON* light goes off and the *OFF* light turns on.
 - b. If the CAT-DEV is not turned on, press the ON/OFF switch on the side of the CAT-DEV. The system turns on in an idle state. The red *OFF* light is illuminated and the blue *ON* light remains off.
2. Press and hold the **INIT** Button located next to the *HDD* light on the front of the CAT-DEV until the blue *STAT* light begins to blink. This reverts the configuration back to the default factory settings.
3. To find the new IP address of your CAT-DEV:
 - a. On the host PC, navigate to the folder where you installed the Cafe SDK, and then double-click `cafex_env.bat`.
 - b. At the command prompt, type `findbridge -all`, and then press ENTER. This starts a search for all CAT-DEVs on your network.
 - c. When the search finishes, a list of all connected CAT-DEVs is displayed with the Bridge Name and IP address. The default Bridge Name for your CAT-DEV is the MAC address. Locate the correct Bridge Name, and then type the corresponding IP address in the address bar of the web browser.
4. After performing these steps, return to [Set Up the CAT-DEV](#), select your hardware configuration, and then repeat the instructions in the *Set Up IP Addresses* section.

Troubleshoot CAT-DEV Issues

- [Troubleshoot Network Installation and Setup Issues](#)
 - [Findbridge Can't Find CAT-DEV - Broadcast Packets Not Allowed on LAN](#)
 - [Findbridge Can't Find CAT-DEV - Operation Across Broadcast Domains](#)
 - [Findbridge Can't Find CAT-DEV - Windows Firewall](#)
 - [Findbridge Can't Find CAT-DEV Connected to UnManaged Switch - Operation From VPN to Another Network](#)
 - [Cannot Acquire IP Address - DHCP Unavailable](#)
 - [Restore Factory Default Network Settings](#)
 - [CAT-DEV LED Descriptions](#)
 - [cafe.bat opens with a warning message](#)
- [Troubleshoot GamePad \(DRC\) Issues](#)
 - [Posting your GamePad \(DRC\) issue for discussion](#)
- [Troubleshoot Update Issues](#)
 - [Updating a CAT-DEV fails with error -262146](#)
- [Troubleshoot Demo Failure Issues](#)
 - [SDK demos fail to run due to file permission errors on the host PC](#)
- [Troubleshoot Boot Mode Issues](#)
 - [Recover a CAT-DEV with NAND-related issues](#)
 - [The `cafex run` command fails](#)
 - [The `cafex run` and `cafex setbootmode PCFS` commands fail](#)
 - [The `cafex on` and `cafex run` commands fail](#)
 - [The CAT-DEV only boots into System Config Tool](#)
 - [The `cafex run`, `cafex on`, or other `cafex` commands fail with mismatched boot mode](#)
- [Troubleshoot Screen Issues](#)
 - [The screen of a device attached to a CAT-DEV dims](#)

Troubleshoot Network Installation and Setup Issues

Findbridge Can't Find CAT-DEV - Broadcast Packets Not Allowed on LAN

MULTI tool chain uses TCP/IP broadcast packets to find CAT-DEV by name or MAC address if the IP address is unknown. However, corporate network environments that do not allow broadcast packets filter them at the router level.

Try using a local switch to connect the host PC and the CAT-DEV to your network. A local, unmanaged switch provides a direct routing path between the host PC and the CAT-DEV, bypassing this restriction.

You may also use a static IP address for the CAT-DEV. However, if broadcast packets are not allowed, you must connect the host PC directly to the CAT-DEV. For more information, see [Direct Connection](#) in [Set Up the CAT-DEV](#).

Findbridge Can't Find CAT-DEV - Operation Across Broadcast Domains

The CAT-DEV cannot communicate with a host PC from a different broadcast domain. Ensure that the CAT-DEV and the host PC are in the same broadcast domain. Consult your IT department for details.

Findbridge Can't Find CAT-DEV - Windows Firewall

The Windows Firewall may interfere with operation of the findbridge tool. To unblock the tool:

1. On the host PC with Windows 7, click **Start**, click **Control Panel**, click *System and Security*, and then click **Windows Firewall**.
2. Click **Allow a program or feature through Windows Firewall**.
3. Click the check box in the *Home/Work* column, next to *FindBridge*.

Findbridge Can't Find CAT-DEV Connected to UnManaged Switch - Operation From VPN to Another Network

The CAT-DEV is not reachable if the *Local LAN Access* feature is not allowed on the network. If it is allowed, enable the *Allow Local LAN Access* feature in your VPN client.

Cannot Acquire IP Address - DHCP Unavailable

If DHCP is disabled in your network environment, configure a static IP address on the CAT-DEV. Because DHCP is not available, you must connect the host PC directly to the CAT-DEV. For more information, see [Direct Connection](#) in [Step 5: Set Up the CAT-DEV](#).

After you establish a direct connection with the CAT-DEV and can access the configuration page for the host bridge, follow the instructions in the [Set Up a Static IP Address](#) in [Step 5: Set Up the CAT-DEV](#).

Restore Factory Default Network Settings

As a last resort for CAT-DEV connection issues, you may restore the CAT-DEV network configuration parameters to the factory default settings:

1. Ensure that the CAT-DEV is turned on.
2. Press and hold the **INIT** Button on the front panel of the CAT-DEV for at least 4 seconds.

CAT-DEV LED Descriptions

There are several LEDs on the front of the CAT-DEV that show information about the state of MION and CAFE. For information about the LEDs, see ***Cafe SDK Basics*** → ***Development Cycle*** → ***Run Applications*** → ***CAT-DEV LEDs*** in the online MAN pages.

cafe.bat opens with a warning message

When you open `cafe.bat`, you receive the following warning message.

```
*****
WARNING: GHS MULTI.EXE not found at C:\ghs\multixxx\
YOU MUST ACQUIRE AND INSTALL MULTI TO BUILD
*****
mionps: ERROR: MIONTCPSession to ip 10.1.4.149 returned error code 5
```

The `cafe.bat` script expects a specific version of MULTI as documented in the *Cafe SDK Release Notes*. If you installed a later version of MULTI, to avoid the warning message, update the MULTI version referenced in `cafe.bat` to match the version of MULTI that you installed.

1. Navigate to the location where you installed the Cafe SDK, right-click `cafe.bat`, and then click **Edit**. The `cafe.bat` script opens in a text editor.
2. Find the line that says `set GHS_ROOT=C:\ghs\multi53xx`, where "53xx" corresponds to the expected version of MULTI such as "5318", and then change the version to match the version of MULTI that you downloaded and installed. For example, if you installed MULTI version 5.3.19, then change the version in the code to `set GHS_ROOT=C:\ghs\multi5319`.
3. Click **File**, click **Save**, and then close the editor.

Troubleshoot GamePad (DRC) Issues

Posting your GamePad (DRC) issue for discussion

If you encounter GamePad issues and want to post the issue for feedback from other developers or from your local Nintendo developer support group, it would be helpful to have as much information as possible. Use the suggested form found on [GamePad Bug Report Form](#) to help you collect and post the information necessary to help others understand your problem.

Troubleshoot Update Issues

Updating a CAT-DEV fails with error -262146

The update directory is `%CAFE_ROOT%\data\mlc\sys\update\pcfs`. Updating the boot1 image fails if there are multiple directories in the update directory, and you receive the following message:

```
Update /vol/storage_hfiomlc01/sys/update/pcfs Failed: -262146
```

The ON (Blue) LED also blinks. For information about the LEDs, see *Cafe SDK Basics* → *Development Cycle* → *Run Applications* → *CAT-DEV LEDs* in the online MAN pages.

To resolve this issue, delete any directories in the update directory that were not originally packaged with the SDK.

Troubleshoot Demo Failure Issues

SDK demos fail to run due to file permission errors on the host PC

Sometimes, SDK demos fail to run because of errors related to file permissions on the host PC. For example, you may see the following error message:

```
exception::handle: Exception:STATUS_ACCESS_VIOLATION
```

To work around these issues, run `rebaseall` from an `ash` or `dash` shell command prompt:

1. Close all Cygwin command shells.
2. Open a Windows command shell.
3. Navigate to the `cygwin\bin` folder. By default, this location is `C:\cygwin\bin`.
4. Invoke `ash rebaseall` or `dash rebaseall`.

Troubleshoot Boot Mode Issues

Recover a CAT-DEV with NAND-related issues

There may be difficulties switching to NAND boot mode in the rare case of NAND corruption issues. To recover from such a scenario and return to PCFS boot mode, try one of the following options.

1. Option 1: Use System Config Tool to switch from NAND boot mode to PCFS boot mode:
 - a. Open `cafex_env.bat`
 - b. Run the `cafex on` command
 - c. Using the "Wii Classic Controller" select "Update" in System Config Tool
 - d. Using the "Wii Classic Controller" install the "pcfs" update package
 - e. Open another `cafex_env.bat`
 - f. In the new Cafe shell, run the `cafex cleardata` command.
2. Option 2: Use the `cafex setbootmode` command:
 - a. Open `cafex_env.bat`
 - b. Run the `cafex setbootmode NAND` command. This step will format the NAND on the CAT-DEV and leave it in a clean state (for that SDK)
 - c. To revert to PCFS, run the `cafex setbootmode PCFS` command
3. Option 3: Use the "recovery" method:
 - a. Power off the CAT-DEV
 - b. Press the **POWER** Button and **EJECT** Button on the CAT-DEV at the same time to boot to recovery mode

- c. Open `cafex_env.bat`
- d. Run `cattoucan -p localhost:6001` to monitor the CAT-DEV status
- e. Open another `cafex_env.bat`
- f. In the new Cafe shell, run the following command:

```
devkitmsg 'update /vol/storage_hfiomlc01/sys/update/pcfs'
```

During the recovery process, the CAT-DEV LEDs blink in an ON-OFF-CC sequence. For information about the LEDs, see ***Cafe SDK Basics*** → ***Development Cycle*** → ***Run Applications*** → ***CAT-DEV LEDs*** in the online MAN pages.

To return the CAT-DEV to PCFS boot mode after successfully using one of these options, ensure that `CAFE_BOOT_MODE` is set to PCFS in your environment. If none of these options work, contact your local Nintendo developer software support group.

The `cafex run` command fails

If a CAT-DEV configured to boot from NAND is not powered on when `cafex run` is called, the `cafex run` command fails.

For example:

```
$ make run
-----
Building/Installing demo/helloworld DEBUG

>> Compiling helloworld
...
-----
caferun -b -w 0
/cygdrive/k/sdk/cafex_sdk/system/bin/ghs/cafex/demo/helloworld/DEBUG/helloworld.rpx
caferun: Will use NAND file system
caferun: bridge parameters: -em
caferun: Copying default config file to
/cygdrive/k/sdk/cafex_sdk/system/bin/ghs/cafex/demo/helloworld/DEBUG/app.xml
caferun: Copying default config file to
/cygdrive/k/sdk/cafex_sdk/system/bin/ghs/cafex/demo/helloworld/DEBUG/cos.xml
Updating title id, group id and app type in
/cygdrive/k/sdk/cafex_sdk/data/disc/meta/meta.xml, based on
/cygdrive/k/sdk/cafex_sdk/system/bin/ghs/cafex/demo/helloworld/DEBUG/app.xml...
devkitmsg failed: timed out waiting for response (258)
make[1]: *** [rerun_binary] Error 127

make: *** [rerun] Error 2
```

The `cafex run` and `cafex setbootmode PCFS` commands fail

If the Boot Mode is set to NAND and the *System Mode* is set to *Production*, the `cafex run` and `cafex setbootmode PCFS` commands fail. To use these commands, you must change the *System Mode*. The new setting is enabled after restarting.

The `cafex on` and `cafex run` commands fail

If the Boot Mode is set to `PCFS` and the *System Mode* is set to *Production*, the `cafex on` and `cafex run` commands fail. You must to edit `dev_mode` in the `system.xml` file to `recover`.

The CAT-DEV only boots into System Config Tool

When a CAT-DEV is configured to boot from `NAND`, but `CAFE_BOOT_MODE` is set to `PCFS`, `cafex run` always loads the *default title*, which in this case is System Config Tool.

When this behavior is encountered, ensure that `CAFE_BOOT_MODE` is set to `NAND` in the Cafe shell.

The `cafex run`, `cafex on`, or other `cafex` commands fail with mismatched boot mode

The SDK now keeps the current boot mode setting (`NAND` or `PCFS`) in a configuration area inside its CAT-DEV. If a `cafex run`, `cafex on`, or other `cafex` command fails with the following message:

```
ERROR: __CATDEVStateMgr_BootMismatch: Environment boot mode [PCFS]
does not match CATDEV boot mode [NAND]
```

Then the CAT-DEV is configured for `NAND` boot mode but the `cafe.bat` session's `CAFE_BOOT_MODE` environment variable is set to `PCFS`.

To resolve this issue, you may either:

- Set `CAFE_BOOT_MODE` again to the correct value (`NAND`), and then re-run.

OR

- Close, and then re-open the `cafex_env.bat` session, as the CAT-DEV's internal state determines the setting of `CAFE_BOOT_MODE` for the next session.

Troubleshoot Screen Issues

The screen of a device attached to a CAT-DEV dims

The screen on the TV or DRC that is connected to the CAT-DEV becomes dimmed.

To resolve this issue:

Set the **Screen Burn-In Reduction** option from the HOME Menu (HBM) and/or set the **Auto Dimming** option using the *System Config Tool*.

To set the **Auto Dimming** option using the *System Config Tool*, choose **Other Setting**. The **Auto Dimming** option is set to **Use** by default. To enable the screen not to dim, set the option to **Not Use**.

GamePad Bug Report Form

If there is not enough information to analyze a DRC bug, Nintendo may request a report in the following format:

[Title]

Provide a title that describes the bug. For example, "Pairing does not work."

[Description]

- Describe the bug in as much detail as possible.
- Separately describe the repro environment as detailed below.

[Environment]

- CAT-DEV connection – wired or wireless
- DRC-DK or DRC-DK-TV
 - Serial Number
 - Wired or wireless (Note that DRC-DK-TV is wired only.)
- DRH firmware version
- DRC firmware version
- SDK version
- Name of executed program, for example, VPAD or System Config Tool.

You must provide all of the information requested above.

The following information should be provided, if possible.

- Results of testing on other DRCs.
- Results of testing on other CAT-DEV systems.

Revision History

Revision Date	Description
2015/03/16	Updated Cygwin 'make' process.
2015/02/24	Updated the System Update process.
2014/11/18	Correct the name of <code>build sdk_demo.bat</code> .
2014/02/24	Update minimum requirements.
2014/01/24	Update to cafex cleardata command
2014/01/08	Update of debug multirun demo path.
2013/12/18	Update to remove cygwin from core steps
2013/12/12	Update to describe new unbundled patches.
2013/11/25	Updated to include all bug changes since last publication.
2013/10/25	Updated to include all bug changes since last publication.
2013/09/15	Updated to include all bug changes since last publication.
2013/06/15	Converted to PDF format
2013/05/10	Added common terms and CAT-DEV picture
2013/05/08	Automated cleanup pass.
2013/03/01	Merge QSGs into SDK Basics -> Systems.
2012/04/12	Reordered information in File System Emulation Settings.
2011/02/21	Initial version

Green Hills Software, the Green Hills logo, and MULTI are the registered trademarks of Green Hills Software, Inc.

All company and product names in this document are the trademarks or registered trademarks of their respective companies.

© 2011-2015 Nintendo Co., Ltd

The contents of this document may not be duplicated, copied, reprinted, transferred, distributed, or loaned in whole or in part without the prior approval of Nintendo.